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Now... the perfect trio of WELLER TOOLS

to GIVE or RECEIVE for CHRISTMAS

SAWING · SANDING · SOLDERING

With one or more of these faultless Weller tools, inexperienced amateurs as well as able handymen and hobbyists can do *hundreds* of homecraft jobs easily, quickly, successfully.

WELLER SABRE SAW

Portable Jig Saw. Seven saws in one. Cuts wood up to 1" thick, do-it-yourself aluminum, composition board, plastic, etc. Makes its own starting hole. Cuts curves, circles (as tight as a coin), intricate shapes. Exclusive strain-relief design eliminates blade breakage. Reciprocal action. Combination knob and handle grip for positive control. Polished aluminum housing. 3 blades and wrench included. Nothing like it at anywhere near its price. Guaranteed. Model 800

WELLER POWER SANDER and POLISHER

Sands down old paint in a jiffy. Puts satin-smooth finish on new wood . . . but *fast*. Readies old furniture for refinishing by removing scars, stains and other blemishes. 25 square-inch sanding area—twice that of comparably priced sanders. Straight-line action. Makes 14,400 power strokes a *minute*. Sands with the grain. Goes all the way into corners. Fits under low places. Guaranteed. Model 700

WELLER COMPLETE SOLDERING KIT

Latest type Weller Gun. Heats in 5 seconds. Triggermatic control. 2 spotlights to light up work. Joins metal parts. Makes electrical connections. Seals leaks and seams. Kit includes Soldering Brush to clean connections, Soldering Aid to twist wires, famous Kester Solder. Another practical do-it-yourself home tool to give or receive this Christmas. Guaranteed. Model 8100K

AVAILABLE FOR CHRISTMAS FROM YOUR HARDWARE DEALER

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Popular Science Monthly

November, 1918

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Author:

Jack Wilson
Universal Pictures
Universal City, California

PS Readers

Tony Smith

Tony Smith, Kalamazoo

Tony Smith is a Kalamazoo, Michigan based photographer who has been shooting with his Pentax 645 since the early days of digital. He's been using the 645D since it was released and has shot over 100,000 images with it. Tony's work has been published in many magazines and he has been featured in several photography books. He has also been a contributor to the Pentax Forum for many years. Tony's work can be seen on his website at www.tonysmithphotography.com.

THE WORLD'S MOST WIDELY OF THE WORLD'S PUREST SILICON

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A COMPLETE LINE OF PRECISION HAND TOOLS FOR ELECTRONICS, INSTRUMENT, AUTOMOTIVE, AIRCRAFT, MACHINE SHOP, MAINTENANCE, ETC.

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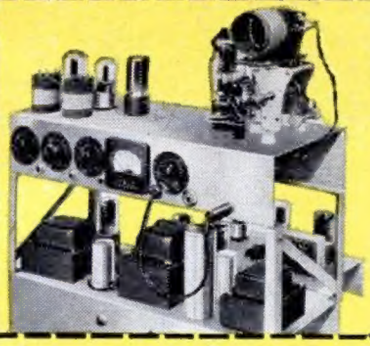
Cycle to the nearest Radio Shack Electronics Parts Store for a complete line of Radio Shack Electronics Parts and Tools.

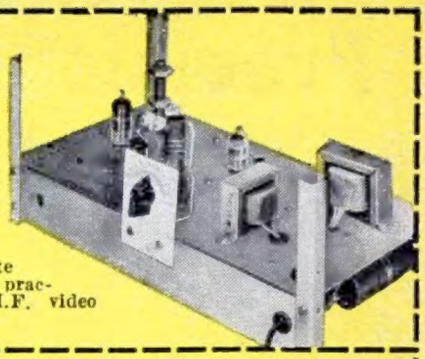
Radio Shack Electronics Parts Stores are located in Boston, Cambridge, Somerville, Lynn, Malden, Medford, Revere, Chelsea, Everett, Lynnfield, Peabody, Danvers, Salem, Marblehead, Swampscott, Stoneham, Woburn, Reading, Wakefield, Melrose, Stoneham, Lexington, Arlington, Belmont, Watertown, Newton, Brookline, Dedham, Needham, Wellesley, Natick, Framingham, Sudbury, Hudson, Marlboro, Westboro, Shrewsbury, Northboro, Grafton, Milford, Bellingham, Franklin, Medway, Millis, Norfolk, Walpole, Foxboro, Mansfield, Attleboro, Norwood, Canton, Stoughton, Randolph, Holbrook, Braintree, Weymouth, Hingham, Cohasset, Hanover, Pembroke, Marshfield, Duxbury, Kingston, Plymouth, Bridgewater, Brockton, Abington, Rockland, Hanson, Whitman, Hingham, Hull, Quincy, Milton, Dorchester, Roxbury, Jamaica Plain, Roslindale, Hyde Park, Mattapan, Dorchester, Brighton, Allston, Cambridge, Somerville, Medford, Malden, Revere, Lynn



YOU BUILD Broadcasting Transmitter

As part of N.R.I. Communications Course you build this low power Transmitter; use it to learn methods required of commercial broadcasting operators, train for FCC license.

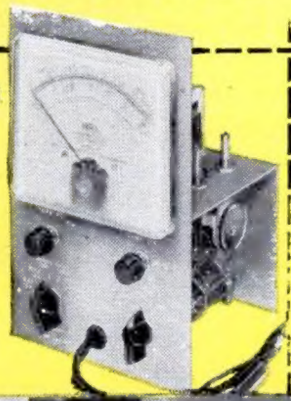
YOU BUILD Signal Generator



N.R.I. sends kits of parts to build this Signal Generator. You get practical experience, conduct tests to compensate Radio frequency amplifiers, practice aligning a typical I.F. video amplifier in TV circuit.

YOU BUILD Vacuum Tube Voltmeter

Use it to get practical experience, earn extra cash fixing neighbors' sets in spare time. With N.R.I. training you work on circuits common to both Radio and TV. Equipment you build "brings to life" things you learn in N.R.I.'s easy-to-understand lessons. 64-page Catalog FREE, shows all equipment you get.



YOU BUILD AC-DC Superhet Receiver

N.R.I. servicing training supplies all the parts, everything is yours to keep. Nothing takes the place of practical experience. You get actual servicing experience by practicing with this modern receiver; you learn-by-doing.

Learn RADIO TELEVISION

by Practicing at Home

WHAT GRADUATES DO AND SAY

"I am Chief Engineer of Station KGCU in Mandan, N.D. I also have my own spare time business servicing high frequency two-way communications systems." R. BARNETT, Bismark, N.D.

"We have an appliance store with our Radio and TV servicing, and get TV repairs. During my Army service, NRI training helped get me a top rated job." W. M. WEIDNER, Fairfax, S.D.

"I am doing very well in spare time TV and Radio. Sometimes have three TV jobs waiting and also fix car Radios for garages. I paid for instruments out of earning." G. F. SEAMAN, New York, New York.

NEED FOR TECHNICIANS INCREASING

Fast Growing Field Offers Good Pay, Bright Future

Today's OPPORTUNITY field is Radio-Television. Over 125 million home Radios plus 30 million set in cars and 40,000,000 Television sets mean big money for trained Radio-TV Technicians. More than 4,000 Radio and TV Broadcasting stations offer interesting and important positions for technicians, operators. Color television, portable TV sets, Hi-Fi, other developments assure future growth.

It's the trained man who gets ahead. The fellow who uses his spare time to develop knowledge and skill gets the better job, drives a better car, lives in a better home, is respected for what he knows and can do. So plan **now** to get into Radio-TV.

Keep your job while training with N.R.I. You learn at home in your spare time. N.R.I. is the oldest and largest home study Radio-TV School. Our methods have proved successful for more than 40 years.

Soon after enrolling, many N.R.I. students start to earn $10, $15 a week extra in spare time fixing sets. Many open their own full-time Radio-TV shops after getting N.R.I. Diploma. Find out more. Mail Coupon. Cost is low, terms easy; includes all equipment. Address: National Radio Institute, Dept. 6NB, Washington 9, D.C.

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Keeping the Home Shipshape

Keep a Dust Cloth Handy. Dust furniture and woodwork with a cloth dampened with a few drops of oil. Dust will not fly and will be easier to remove.

Keep Your Vacuum Cleaner Ready. Keep your vacuum cleaner ready for use. Dust and lint will be easier to remove if they are not allowed to accumulate.

Keep Your Mop Handy. Keep your mop handy for quick cleanup of spots on floors. Wipe up spots with a damp mop before they have time to dry.

Keep Your Dishes Ready. Keep your dishes ready for use. Wash them as soon after meals as possible. Dry them and put them away.

Keep Your Bed Ready. Keep your bed ready for use. Make it as soon after you get up as possible. Air it and put it away.

Keep Your Table Ready. Keep your table ready for use. Clear it as soon after meals as possible. Wipe it and put it away.

Keep Your Stove Ready. Keep your stove ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Sink Ready. Keep your sink ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Refrigerator Ready. Keep your refrigerator ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Cupboard Ready. Keep your cupboard ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Floor Ready. Keep your floor ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Bathroom Ready. Keep your bathroom ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Kitchen Ready. Keep your kitchen ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Bedroom Ready. Keep your bedroom ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Living Room Ready. Keep your living room ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Dining Room Ready. Keep your dining room ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Porch Ready. Keep your porch ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Yard Ready. Keep your yard ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Garden Ready. Keep your garden ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Car Ready. Keep your car ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Garage Ready. Keep your garage ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Barn Ready. Keep your barn ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Chicken House Ready. Keep your chicken house ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Pigpen Ready. Keep your pigpen ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Cow Barn Ready. Keep your cow barn ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Horse Barn Ready. Keep your horse barn ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Sheep Barn Ready. Keep your sheep barn ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Goat Barn Ready. Keep your goat barn ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Rabbit Hutch Ready. Keep your rabbit hutch ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Bee Hive Ready. Keep your bee hive ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Fish Pond Ready. Keep your fish pond ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Bird Bath Ready. Keep your bird bath ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Flower Bed Ready. Keep your flower bed ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Vegetable Garden Ready. Keep your vegetable garden ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Orchard Ready. Keep your orchard ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Woodpile Ready. Keep your woodpile ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Tool Shed Ready. Keep your tool shed ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Chicken Coop Ready. Keep your chicken coop ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Pigeon Loft Ready. Keep your pigeon loft ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Dog House Ready. Keep your dog house ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Cat House Ready. Keep your cat house ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Horse Ready. Keep your horse ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Cow Ready. Keep your cow ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Sheep Ready. Keep your sheep ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Goat Ready. Keep your goat ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Rabbit Ready. Keep your rabbit ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Bee Ready. Keep your bee ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Fish Ready. Keep your fish ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Bird Ready. Keep your bird ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Flower Ready. Keep your flower ready for use. Clean it as soon after meals as possible. Wipe it and put it away.

Keep Your Vegetable Ready. Keep your vegetable

We'll train & establish you in

Your Own Business

. . . even if now employed

We are enlarging this 26-year-old world-wide chain of Duraclean dealerships. Many excellent locations are still available in the U.S.A., Canada, and other countries. If you are reliable and diligent, this is an opportunity to increase your income . . . and have the freedom, financial independence, and prestige of YOUR OWN business.

These are full time dealerships . . . but you can start in spare time and have a profitable, lifetime business when your present job ends. A Duraclean dealer will train and assist you. He'll reveal his successful, proven methods and sales plans. He'll **work with you.**

Alert dealers can average $5 hourly gross profit on service they render plus $3 on EACH service-man at National Price Guide charges. This business is **easy** to learn . . . quickly established.

World-wide Service

FREE Booklet tells how!

You Become an Expert

in cleaning and protecting Rugs and Upholstery

DURACLEAN cleans by *absorption.* It eliminates scrubbing . . soaking . . shrinkage. Aerated foam, created by electric Foamovator, restores natural lubrication in rugs and upholstery. Dirt, grease and many unsightly spots vanish. Fabrics and floor coverings are cleaned with *a new consideration for their life and beauty.*

This modern process avoids strong soaps and machine scrubbing, eliminating unnecessary wear and breaking of fibers. Fabric life is increased. **DURACLEANING** is done *in the home.* Customers like this convenience. Fabrics dry in a few hours. Rug pile again stands erect and even. Brilliant colors revive. Furnishings become clean, fresh and enlivened.

DURAPROOF is another year 'round service rendered in the home, office or institution — *without removing furnishings.* It protects upholstery, rugs, furs, clothing and auto interiors against damage by moths and carpet beetles. U.S. Government says **"Moths are present in practically every household . . No section of country seems free from such infestations." DURAPROOF** kills moths and carpet beetles . . it makes materials non-eatable to both. **DURAPROOF** is backed by an International 6-Year Warranty.

Easy to Learn • No Overhead Expense

Permanent, Growing Market

Service is rendered **IN** homes, offices, hotels, theaters, institutions and to revive used-car upholstery for auto dealers. There is need for these services in almost every building. Duraclean dealers operate from their home, an office or shop, as they prefer. It's **easy to learn** . . . we quickly train you. Rendering service yourself, at first, prepares you to train and supervise service men.

Repeat and Voluntary Orders

Demonstrations win new customers. DURACLEAN Dealers find REPEAT and VOLUNTARY orders a major source of income. Customers, enthused with results, tell friends and neighbors. Furniture and department stores and others turn over rug and upholstery cleaning and mothproofing to **DURACLEAN** Dealers. We show you **27 ways** to get new customers.

We Help YOU Grow

Our **MUTUAL COOPERATION** program gives you many unique and continuous advantages: **National Advertising** in Life, McCalls, House & Garden, Canadian Homes & Gardens and a dozen others. **Copyright and trademark** protection. **Certificate** approves equipment and materials. **Products Insurance. Six-year Warranty. Pocket Demonstrators. Sales Book. Advertising Folders & Cards. Tested Ads. Ad Cuts & Mats. Store Display Cards. Radio & TV Musical Commercials.** Home Show **Booth Display. Publicity Program** gets FREE local newspaper stories. **Prizes. Laboratory** research and development. **Monthly Magazine. Resale Service. Annual Conventions.** Behind all this is a **26-YEAR-OLD** headquarters interested in YOUR personal success. If you want to become the owner of a **DURACLEAN** Service business, you should inquire now, TODAY, while territory is still available.

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W. Lookiebill: We've had 20 years of pleasant dealings. I'm 65 but am setting my sights for 20 more years.
Gerald Merriman: $700 cleaning...only 13 working days.
P. D. Freidinger: 70% of our business is repeat.
A. Ullman; Every demonstration has been a sale.
Ellsworth: Your advertising certainly has paid dividends.
M. Lassanske: Original investment returned in two months. Not sorry I started 'on a shoe string.'
R. Kimbrough: Finished First White House of Confederacy and am to **Duraclean** the Governor's Mansion.
Margarette Turner: Took in $106 in 15 or 18 hours.
L. Johnson: Each customer leads to 3 or 4 more.

EASY TERMS

A moderate payment establishes your own business—pay balance from sales. We furnish electric machines, folders, store cards, introduction slips, sales book, demonstrators and enough material to return your TOTAL investment.

COMMENDED BY THE CONSUMER SERVICE BUREAU OF PARENTS' MAGAZINE AS ADVERTISED THEREIN

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As a Duraclean dealer, your services are backed by this famous seal of quality . . . proof that Duraclean has passed rigorous tests. No competitor in your town can boast this seal. Duraclean has also been tested and certified by the American Research & Testing Laboratories. No wonder it's so easy to get business!

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DURACLEAN CO., 6-18D Duraclean Bldg., Deerfield, Illinois

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Address_____

City_____ State_____

Prize Projects by the Readers

Big Bear. This 3-ton Bear, 12 feet long, 6 feet high, 4 feet wide, is made of 2-inch pipe and 1-inch angle iron. It is mounted on a 2-inch pipe axle and 4 wheels. It is used for a playground piece. Mr. Frank Lyons, Jr., Ashtabula, Ohio, made it.

Big Tow Truck. This truck is made of 2-inch pipe and 1-inch angle iron. It is 12 feet long, 6 feet high, 4 feet wide. It is used for a playground piece. Mr. Frank Lyons, Jr., Ashtabula, Ohio, made it.

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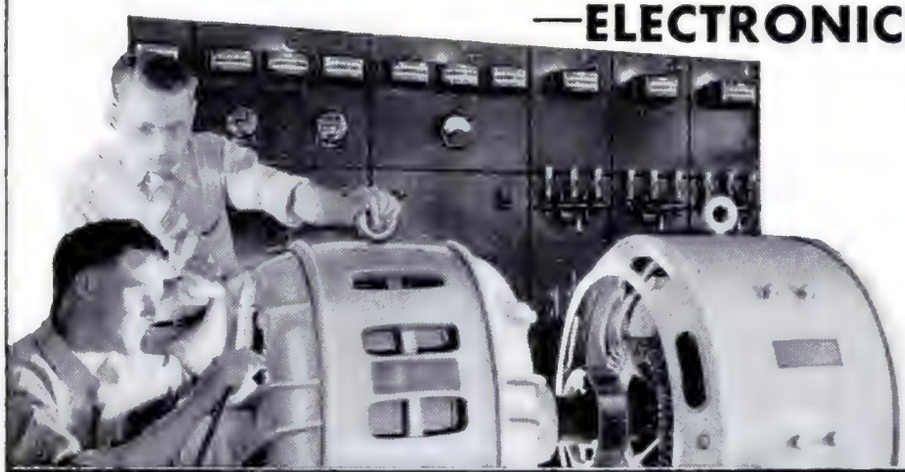
IN ELECTRICITY —ELECTRONICS

On Real:



A.C. and D.C. MOTORS
GENERATORS
SWITCHBOARDS
CONTROLLERS
WIRING JOBS
APPLIANCES
ELECTRONIC UNITS

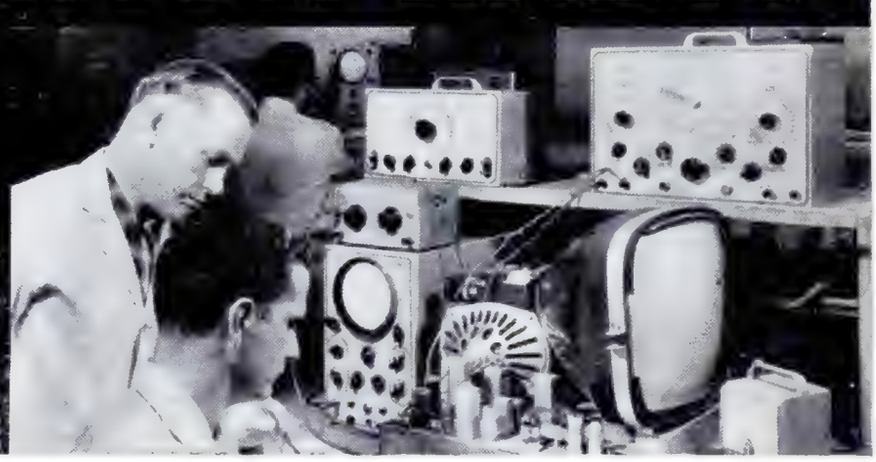
(Shown at left—Instructor explaining operation and testing of a large Motor Generator in our A.C. Department.)

AND TELEVISION-RADIO

On Real:

TELEVISION RECEIVING SETS Including Color TV
AM and FM RADIO RECEIVERS including AUTO RADIOS
TELEVISION TEST EQUIPMENT

(Right — Instructor helping students check the wiring and trace circuits of television receivers.)



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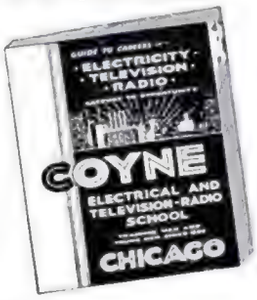

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INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

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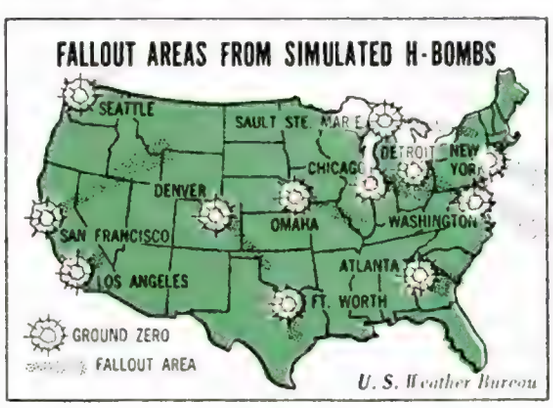
Late News

Will we see over the edge of the universe? This intriguing possibility is raised by new electronic devices that amplify light to multiply the reach of astronomers' telescopes. Westinghouse showed off one of the latest, a compact attachment intended for the Palomar telescopes. It works like a television camera, displaying on a luminous screen an image 10 times brighter than the telescope could otherwise produce. This lets the telescope detect fainter stars, increasing its range nearly three times—Palomar's big 200-inch job could then see perhaps six billion light years away. There might not be anything that far off. The universe began, most scientists believe, as a point that exploded five or six billion years ago and has been flying apart ever since. The parts—stars—would not have had time to get so far away from us that their light would take six billion years to reach us. If the amplifier-equipped telescopes do pick up objects at such a distance, the astronomers may conclude that they are: (a) wrong about the origin of the universe, (b) seeing other universes now unknown, or (c) watching Genesis.

Weather makes a big difference in an H-bomb attack, as this map shows. The shaded areas indicate how far radioactive fallout would have spread 12 hours after bombs hit these cities, based on the wind patterns for last September 10. Strong northwesterly winds aloft in the eastern part of the United States would carry bomb debris from Detroit to the Washington area within half a day, says the Weather Bureau.



The Government's campaign against bootleggers of stay-awake pills—see "Don't Stay Awake to Die," PS, Oct.—scored 100 percent. The Food and Drug Administration told POPULAR SCIENCE this fall, "Pleas were entered in all cases, and all the defendants have been sentenced, except one." Meanwhile one physician, Dr. John R. Rodger, spoke out to defend the stay-awake drug, amphetamine, as a means of keeping drivers alert. It is a valuable accident-preventive, he said, when properly prescribed for people who must drive when tired or who get sleepy at the wheel even when they are not tired.

The controversy over polio vaccine that upset parents last year threatens to flare up again. Now there's a new vaccine ready for testing (not general use). This one was developed by Dr. Albert B. Sabin, a

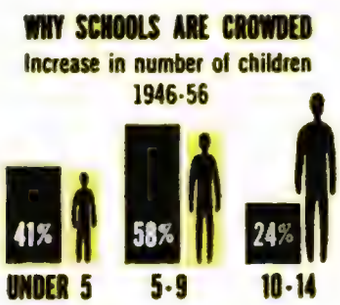
Late News

vocal critic of the Salk vaccine. Sabin uses *live* polio virus of a breed that cannot cause illness but can induce immunity to the harmful polio virus.

New kinds of color-television sets—possibly cheaper—may be on the market in a year or so. The big change will be in the picture tube. All color sets now use three-gun tubes, with one electron gun for each primary color. These are delicate and costly to make. A single-gun tube would be simpler. Du Mont is now getting one of this type—the Chromatic, invented by physicist Dr. E. O. Lawrence—ready for mass production. General Electric and Philco are also working on one-gun tubes, but have said nothing yet about production.

A machine that reads out loud to blind people seems close to actuality. There have been "light pencils," which read ordinary printed letters and convert them into electrical signals. The problem is converting the electrical signals into recognizable sounds. Most machines either give out beeps or monotonously spell words letter-by-letter. Now Dr. Milton F. Metfessel of the University of Southern California has invented a new machine language, called "spelled-speech." It is an easy-to-learn pidgin English that uses 25 sounds to represent the 26 letters. These sounds are recorded on a magnetic drum. A scanner recognizes the printed letters, and signals the drum for the equivalent sounds. The sounds are played off the drum in rapid succession, making audible words in spelled-speech about as fast as people ordinarily talk.

What every taxpayer knows, as well as every parent and school official, is only pinned down in the cold statistics at the left: There are more children than ever before. The population 18 years old and younger is now nearly 56,000,000, an increase of one third—14,000,000—over the figure 10 years ago. (By comparison, the number of children increased only 12,000,000 in the 30 years between 1900 and 1930.) The big bulge is in the five-to-nine-year-old group; the number of youngsters in the 15- to 17-year-old bracket has actually decreased.



Metropolitan Life Insurance Co.

Short takes. Redecorating your house will cost more this spring. The big paint manufacturers are raising prices, 25 to 30 cents a gallon . . . Motorists like the new super-high-test gasoline (see PS, Oct.). Sales match the gas companies' expectations, and Sun Oil is expanding use of its five-in-one pump (a dial selects the grade you want) throughout Florida and into Georgia . . . Tires made of butyl, the synthetic used for inner tubes, will be on sale experimentally. They hold air better, stop shorter, won't squeal, resist oxidation. Price: About $100 per set.

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

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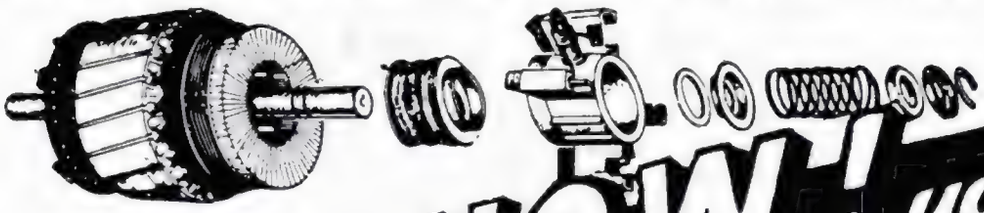

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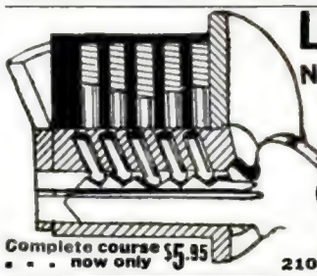

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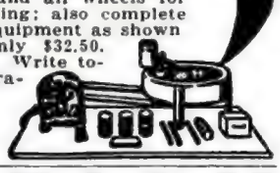

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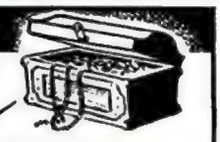

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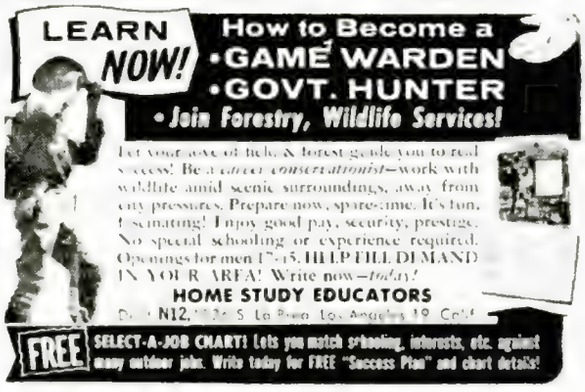

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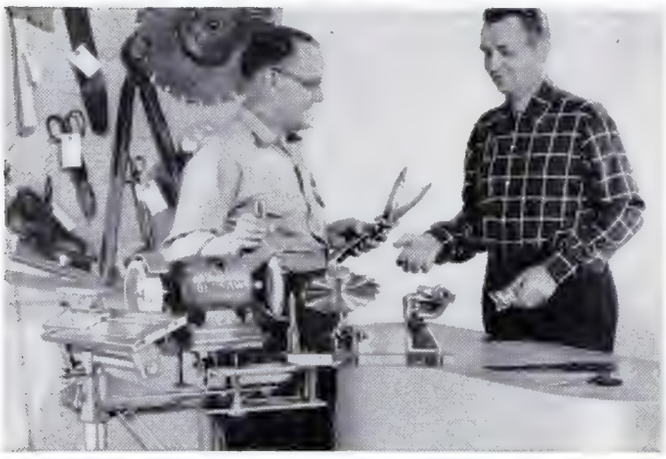

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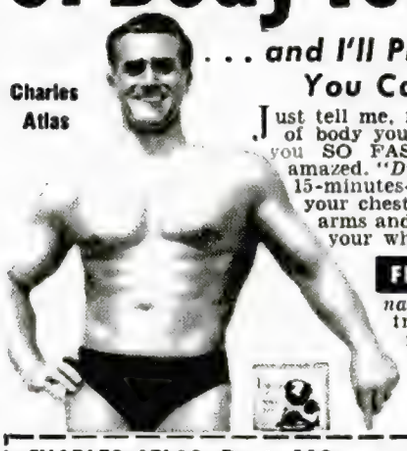

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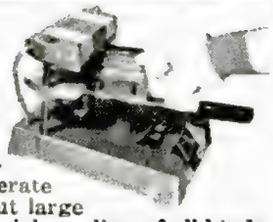

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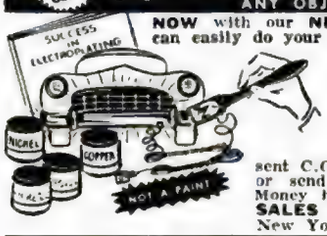

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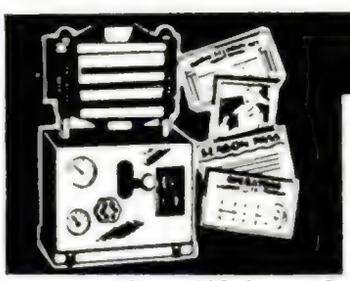

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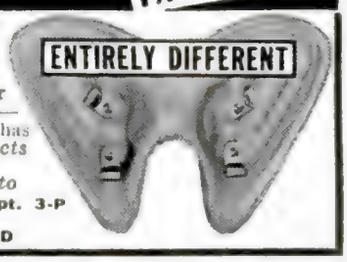

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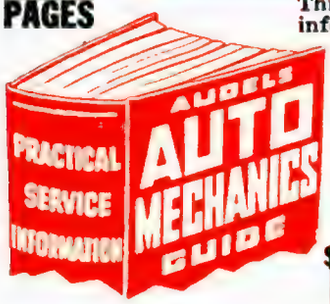

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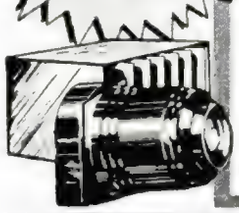

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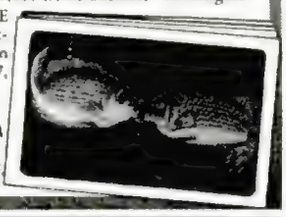

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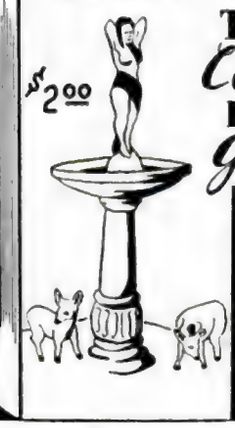

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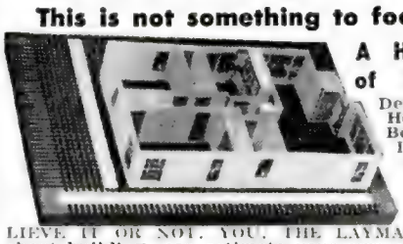

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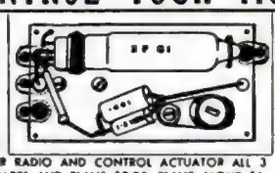

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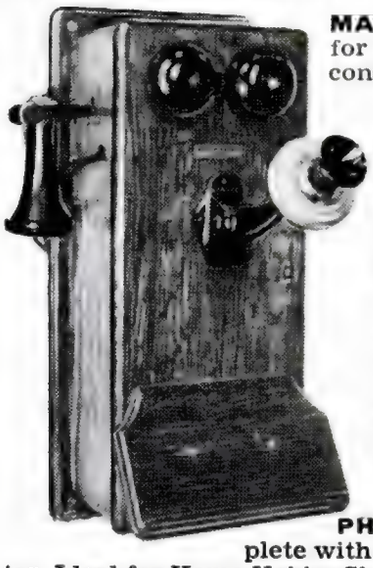

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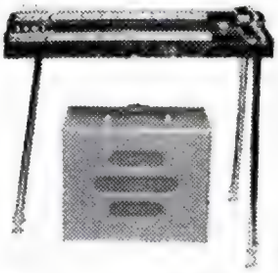

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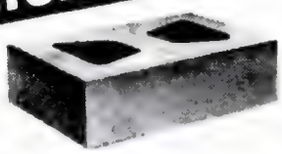

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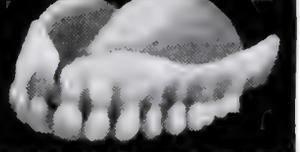

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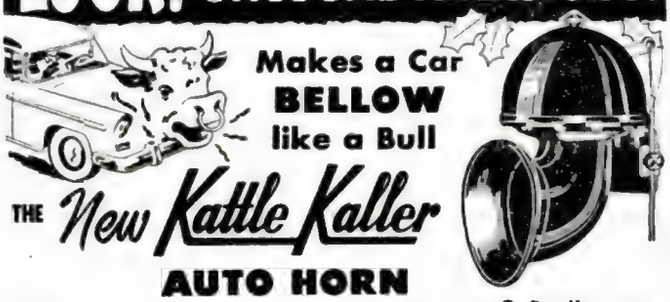

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TELEPHONE WIRE—All weather, all purpose wire on original factory reels. W110B 18 ga. 2-conductor insulated copper-steel conductors.

New Perfect—Select grade	Grade 1, unused like new
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1 mile reel.....$32.50	1 mile reel.....$22.50
	500 ft. reel.....$5.95

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Bonn

Riding the Locomotive

By Jim Boyd, Photos by Jim Boyd and Bill Gaines

When Railroad Magazine asked me to write a feature about a ride on the locomotive, I was sure it would be a piece about a ride on a steam locomotive, or a diesel locomotive, or an electric locomotive, or a diesel-electric locomotive, or a diesel-hydraulic locomotive, or a gas-turbine locomotive, or a gas-electric locomotive, or a battery-electric locomotive, or a battery-diesel locomotive, or a battery-gas locomotive, or a battery-gas-electric locomotive, or a battery-gas-electric-diesel locomotive, or a battery-gas-electric-diesel-hydraulic locomotive, or a battery-gas-electric-diesel-hydraulic-steam locomotive, or a battery-gas-electric-diesel-hydraulic-steam-turbine locomotive, or a battery-gas-electric-diesel-hydraulic-steam-turbine-gas-turbine locomotive, or a battery-gas-electric-diesel-hydraulic-steam-turbine-gas-turbine-electric locomotive, or a battery-gas-electric-diesel-hydraulic-steam-turbine-gas-turbine-electric-diesel locomotive, or a 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That Shifts Like a Car

By Jack Lenor Larsen

Mr. Larsen's Swedish Volkswagen, a 1963 model, has a gear shift that works like that of a car. Its lever is mounted on the floor, instead of on the steering column, and it has a reverse gear. The shift lever is located in the center of the floor, between the driver's seat and the passenger seat, and it is operated by a knob on the end of the lever. The knob is pushed forward for second gear, pulled back for third, and pushed sideways for low. The knob is pushed forward for reverse, pulled back for neutral, and pushed sideways for high. The knob is spring-loaded, so it returns to the neutral position when it is released.

Jerry Tarkanian and Jack Kent Cooke celebrate the Rebels' victory over Duke in the 1990 NCAA Tournament.

Jerry Tarkanian and Jack Kent Cooke celebrate the Rebels' victory over Duke in the 1990 NCAA Tournament.

the Pitino years of the mountain years. I think maybe Rupp's [illegible] Kentucky, I don't know, I don't know anything about that.

Tarkanian: Well, I don't know anything about Kentucky either. But I'm sure Rupp's teams were great. I'm sure they were great. But I'm not the person to talk about that.

Cooke: Well, I'm not either. I don't know anything about it. I don't know anything about Kentucky either. I don't know anything about Kentucky either. I don't know anything about Kentucky either

Figure 1. Ancient Egyptian Medicine

Figure 2. Ancient Egyptian Medicine

Egypt was the first country to have a medical profession. Medicine was practiced by priests, who were also astronomers, architects, and engineers. Medical knowledge was passed down from father to son. Medicine was practiced in temples, which were also used as hospitals. Medicine was based on magic and religion. Medicine was also based on observation and experience. Medicine was also based on herbs and minerals. Medicine was also based on surgery. Medicine was also based on dentistry. Medicine was also based on veterinary medicine. Medicine was also based on embalming. Medicine was also based on astronomy. Medicine was also based on mathematics. Medicine was also based on geometry. Medicine was also based on architecture. Medicine was also based on engineering. Medicine was also based on agriculture. Medicine was also based on navigation. Medicine was also based on trade. Medicine was also based on war. Medicine was also based on politics. Medicine was also based on religion. Medicine was also based on magic

When you ride the train of tomorrow, you'll find . . .

- Fares are the same as in ordinary coaches, but the ride is different—smoother, more comfortable. All the bounce is in the locomotive; the cars glide.
- There are no Pullman berths, and you cannot buy reserved seats. Seats recline to let you doze comfortably.
- Baggage cannot be checked through. But luggage racks are lower than usual for easier loading.
- Rest rooms show they've been planned, not crammed in as an afterthought. They're bright and roomy. The hot water is hot.
- There is no diner. A lounge car and a traveling cart provide light refreshments, hot-platter meals.
- Windows have no shades to struggle with. Instead, the glass is deeply tinted at the top, less so lower down.
- It's quiet. Sealed windows, soft head-lining materials, acoustic baffles and rubber mountings insulate you from track noises. You can hear whispered conversations.
- Cars are colorful, with plastic walls bonded to plywood. The floor is vinyl-surfaced tile.
- It's easier to stand or walk. Coaches lean into curves instead of away from them. You sit in your seat without sliding.
- Radiant-panel heating and air conditioning provide comfortable temperatures in any weather.

41 years of railroad service behind it.

At Crestline a "bottom yellow"—with two reds over it—cuts speed to 20. Between 20 and 30 the engine has a rough waddling gait; on poor track, it rolls like a drunken duck.

In the Galion yards signals call for a full stop. "Got to take the running lead," Thornton says. "Number 11 must be in trouble."

The full engine roar bursts upon the cab as the bulkhead door is opened by a preoccupied young man with a shock of dark hair. He's James Dougherty, a design engineer for Baldwin-Lima-Hamilton, makers of the locomotive. Opening a hatch in the forward bulkhead, he crawls into the shark nose to check control equipment. He emerges to stay in the cab as you pick up speed on the running lead. Passing No. 11, Cooper gestures and watches the crew signal back.

"Flat wheel," he says. "They've got to set out the baggage car."

With clear signals, Cooper holds to the 79-mile limit, slowing down only for a 60-mile curve. Rain sleets down hard, almost obliterating the track despite the frantic sweep of wipers. Louder than the storm, the air horn wails warning.

Spray flies in the windows, but it's your ankles that get wet. A four-inch fountain is spouting up from the floor. Thornton grins, helps move your bench.

Dougherty throws back two hinged floor boards. The jouncing bulk of the transmission gleams wetly beneath, a whirling drive shaft behind it. Wheel rumble is loud as he lines the floor flanges with strips of rag. When he drops the boards back, the fountain is licked. It's one of the little things designers can't foresee on a blueprint.

But the rain has let up when Cooper pinches speed down to 45 near Columbus. Picking up the train order and running around No. 11 has cost 10 minutes.

At Columbus a new crew takes over. Engineer Ralph Eisnangle, a square-jawed, keen-eyed man who could play the role in a Hollywood rail epic, makes up two minutes on the single track to Cold Springs.

But the signals turn yellow again before Dayton. At low speed, the engine

[Continued on page 230]

Coming next month: Santa Fe's Two-Story Train

Outer Space Comes Down to Earth

Lunar Resources will use robots to mine the moon.

Lunar Resources, Inc., a Houston-based firm, is planning to mine the moon for its resources. The company's first mission will be to land a robot on the moon to search for water, which could be used for drinking and for fuel. The company hopes to launch its first mission in 2020.

JACK WARNER, KARL GUTZMANN,
DAVID GUTZMANN, AND JOHN GUTZMANN

Inside the 1957 TV Sets

The 1957 TV sets were the last of the tube-based sets. Transistors had arrived in the late 1950s, and by 1960 they had taken over the TV market. The 1957

Ejemplo de Tomas, Jaime y Ana, que se ubican en la cima de una montaña y miden el ángulo de depresión a un objeto ubicado en la base de la montaña.

2	2	2	2	2	2	2	2	2	2	2

PICTURE STABILITY					PICTURE POWER					
AUTOMATIC GAIN CONTROL		NOISE KILLER	INTERFERENCE FILTERS	NUMBER OF ADJACENT CHANNEL TRAPS	NUMBER OF TUBE FUNCTIONS	SENSITIVITY (microvolts per meter)	TUNER	NO. VIDEO AMP. STAGES	POWER SUPPLY	PRICE
TYPE	CONTROL									
derived	switch	no	1 FM trap	1	20	30	cascode	1	transformerless	$160
derived	switch	no	1 FM trap	1	20	30	cascode	1	transformer	$180
keyed	variable	yes	1 FM trap	1	22	30	cascode	1	transformer	$200
derived	none	no	none	none	18	100	pentode	1	transformerless	$90
derived	none	no	none	none	18	100	pentode	1	transformerless	$110
derived	none	no	none	none	18	100	pentode	1	transformerless	$130
keyed	none	yes	none	1	22	n.s.	cascode	1	transformer	$240
derived	switch	yes	1 FM trap	none	19	60	pentode	1	transformerless	$180
keyed	variable	yes	2 IF traps	3	21	35	cascode	1	transformerless	$230
keyed	variable	yes	2 IF traps	3	21	35	cascode	1	transformerless	$290
derived	none	no	none	none	15	300	pentode	1	transformerless	$120
derived	switch	no	1 IF trap	1	25	n.s.	cascode	1	transformer	$160
derived	variable	yes	1 IF trap	1	28	n.s.	cascode	1	transformer	$220
derived	variable	yes	1 IF trap	3	29	n.s.	cascode	1	transformer	$320
derived	switch	no	1 IF trap	1	25	n.s.	cascode	1	transformerless	$150
derived	none	no	2 IF traps	1	20	15-30	neutrode	1	transformerless	$168
keyed	variable	yes	2 IF traps	1	22	10-20	cascode	1	transformer[b]	n.a.
derived	none	no	1 IF trap	none	19	100-190	pentode	1	transformer	$134
derived	none	no	1 IF trap	none	19	80-150	pentode	1	transformerless	n.a.
derived	none	no	1 IF trap	none	19	80-150	pentode	1	transformerless	n.a.
derived	none	yes	1 IF trap	4	27	30	cascode	1	transformer	$200
keyed	variable	yes	1 IF trap	4	29	20	cascode	2	transformer	$230
keyed	variable	yes	1 IF trap	4	36	20	cascode	3	transformer	$300
derived	none	yes	none	2	22	n.s.	cascode	1	transformer	$195
derived	none	no	none	none	17	n.s.	pentode	1	transformerless	$100
derived	none	no	none	none	17	n.s.	pentode	1	transformerless	$110
derived	none	no	none	1	19	n.s.	pentode	1	transformerless	$140
derived	none	no	none	none	19	300	pentode	1	transformerless	n.a.
derived	none	no	none	none	20	50	cascode	1	transformerless	n.a.
derived	none	no	none	none	19	300	pentode	1	transformerless	n.a.
derived	none	no	none	none	19	300	pentode	1	transformerless	n.a.
derived	none	no	none	none	19	300	pentode	1	transformerless	n.a.
derived	variable	no	2 FM traps	1	21	15	neutrode	1	transformer	$180
keyed	variable	no	2 FM traps	1	23	15	neutrode	1	transformer	$250
keyed	variable	yes	2 FM traps	1	25	10	neutrode	1	transformer	$370
derived	none	no	2 FM traps	none	18	20	neutrode	1	transformerless	$130
derived	none	yes	1 IF trap	2	22	n.s.	cascode	1	transformer	$150
derived	none	no	1 IF trap	1	15	n.s.	pentode	1	transformerless	$140
derived	switch	no	3 IF traps	1	23	n.s.	cascode	1	transformer	$180
keyed	none	no	5 IF traps	1	23	n.s.	cascode	1	transformer	$250
keyed	none	no	5 IF traps	3	25	n.s.	cascode	1	transformer	$300
derived	switch	no	3 IF traps	none	n.s.	n.s.	cascode	1	transformerless	$140
derived	switch	no	3 IF traps	none	n.s.	n.s.	cascode	1	transformerless	$160
derived	none	no	none	1	17	n.s.	pentode	1	transformerless	$125
derived	variable	no	none	1	19	n.s.	cascode	1	transformer	$167
derived	none	no	1 IF trap	none	17	70	neutrode	1	transformerless	$180
derived	variable	no	1 IF trap	2	18	35	neutrode	1	transformerless	$223
keyed	variable	yes	1 IF trap	2	22	20	neutrode	2	transformer	$260
derived	none	no	1 IF trap	none	17	100	pentode	1	transformerless	$115
keyed	none	yes	1 IF trap	none	19	25	cascode	1	transformerless	$180
keyed	none	yes	1 IF trap, 1 FM trap	1	21	25	cascode	1	transformer	$200
keyed	none	yes	1 IF trap, 1 FM trap	1	21	25	cascode	1	transformer	$220
derived	none	no	1 IF trap	none	17	30-75	pentode	1	transformerless	$120
derived	none	no	1 IF trap	none	14	50	pentode	1	transformerless	$90
derived	none	no	none	none	17	10	pentode	1	transformer	$160
derived	none	no	none	none	17	8	cascode	1	transformer	$180
derived	variable	yes	none	1	19	5	cascode	1	transformer	$220
derived	none	no	none	none	17	10	pentode	1	transformerless	$130
derived	variable	yes	none	none	17	30	neutrode	1	transformer	$170
derived	variable	yes	none	none	17	30	neutrode	1	transformer	$240
keyed	variable	yes	none	3	21	10	neutrode	2	transformer	$260
derived	none	no	none	2	21	10	cascode	1	transformer	$200
derived	switch	yes	none	2	25	6	cascode	2	transformer	$270
derived	none	no	none	none	21	15	pentode	1	transformerless	$110
derived	none	no	none	1	21	12	pentode	1	transformerless	$160
derived	none	no	1 FM trap, 2 IF traps	2	21	n.s.	cascode	1	transformer	$190
keyed	variable	yes	1 FM trap, 2 IF traps	2	24	n.s.	cascode	2	transformer	$240
derived	none	no	1 FM trap, 2 IF traps	2	18	n.s.	cascode	1	transformer	$125
derived	none	no	1 FM trap, 2 IF traps	2	18	n.s.	cascode	1	transformer	$130
derived	variable	no	none	none	18	50	pentode	1	transformerless	$150
keyed	variable	no	none	2	21	40	cascode	1	transformerless[d]	$180
keyed	variable	no	none	2	21	25	cascode	1	transformerless[d]	$250
derived	variable	no	none	none	18	50	pentode	1	transformerless	$120
derived	variable	no	none	none	18	35	cascode	1	transformerless	$140
keyed	none	yes	high-pass, 1 IF trap	1	24	8	neutrode	1	transformer	$229
keyed	none	yes	high-pass, 1 IF trap	1	22	8	neutrode	1	transformer	$179
derived	variable	yes	1 IF trap	1	23	n.s.	cascode	1	transformerless	$170
keyed	variable	yes	1 IF trap	3	27	n.s.	cascode	1	transformerless[d]	$280
derived	none	no	1 IF trap	none	17	n.s.	neutrode	1	transformerless	$120
derived	none	no	none	none	20	8	pentode	1	transformer	$130
keyed	variable	no	none	none	30	4	cascode	2	transformer	$190
keyed	none	yes	1 IF trap	1	18	20	cascode	1	transformerless	$170
derived	none	yes	1 IF trap	1	17	30	pentode	1	transformerless	$130
keyed	variable	yes	1 IF trap	1	19	n.s.	cascode	1	transformer	$170
keyed	variable	yes	1 IF trap	2	19	n.s.	cascode	1	transformer	$220
keyed	variable	yes	1 IF trap	2	22	n.s.	cascode	1	transformer	$340
keyed	variable	yes	1 IF trap	1	19	n.s.	cascode	1	transformerless	$130

(c)Push-pull audio output (d)Tube filaments wired in parallel N.A. This information not available at press time
N.S. This information not specified by manufacturer

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Fastest Sub

By Rachel Ross

Above: an artist's rendition of the Albacore, the USN's SS-569 and RM-1 sub, with its unique shape.

SOME SUBS ARE MORE EQUAL THAN OTHERS

Since the end of the Second World War, the United States Navy has been the world's leader in the development of submarine technology. Its submarines have been the most numerous, the most powerful, the most sophisticated, the most dangerous, the most feared, the most hated, the most admired, the most envied, the most imitated, the most everything. Since the end of the Second World War, the United States Navy has been the world's leader in the development of submarine technology. Its submarines have been the most numerous, the most powerful, the most sophisticated, the most dangerous, the most feared, the most hated, the most admired, the most envied, the most imitated, the most everything.

Points Way to Undersea Liners

anything afloat. Six nuclear-powered submarines will be built with similar hulls next year.

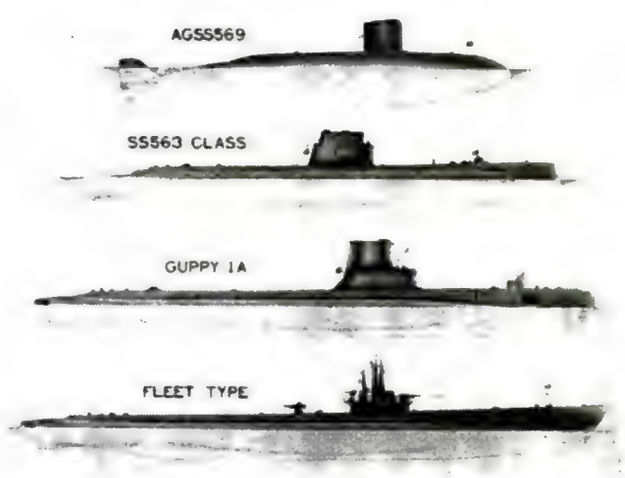
wheels atop them. There is no helm.

"Now hear this," came over the public-address system. "We will be taking angles and heels now."

Crew and visitors prepared themselves for rapid movements of the ship. The pilots and flight-control engineer fastened safety belts. The rest of us grabbed handrails or overhead straps.

Boyes spoke to his maneuvering-room: "Make turns for 18 knots." To his senior pilot, Lt. Theodore F. Davis, the Albacore's exec, he said: "Your ceiling is 100 feet. Your floor will be three-five-zero."

The maneuvering-room reported turns for 18 knots. A minute later, Command-



HOW SUB HULLS EVOLVED is shown by these profiles of U.S. types. The Albacore (at top) has a deceptively plump fish-shaped body. But she is superior in underwater performance even to the nuclear-powered Nautilus and Sea Wolf.

JOHN ST. JOHN, 20, WITH HIS MOTHER, 52, AT HOME IN LOS ANGELES

MRS. ST. JOHN, 52, WITH HER SON, 20, AT HOME IN LOS ANGELES

A Mexican American Mexican Mexican Mexican

Ship's boat, 1 Jan. 1944. Lt. Cdr. Ryan, Lt. Cdr. Ryan's son, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend, Lt. Cdr. Ryan's son's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend's friend

Here's the unedited Ivalu.
Find a page which has an arrow and your finds there.

to alcohol and what alcohol does to you.

What Happens When You Drink Too Much

By Herbert Yahraes

IN THE interest of science, a few years ago, a Yale professor threw two parties in his laboratory. One was for hard, habitual drinkers—a group of derelicts from Skid Row. The other was for light, occasional drinkers—a group of high-school teachers.

The derelicts' party was a dull affair. The guests just sat and drank. They showed no outward sign of alcohol's effect until, one by one, they thudded to the floor in a stupor.

The teachers, though, got happy, some of them even while the drinks were being poured. They joked, laughed, slapped one another on the back, and on two or three cocktails acted tipsy.

But whether, after a few drinks, the guests appeared to be sober as judges or high as kites, an equal number of drinks had given them all approximately the same concentration of alcohol in their blood. Further, by that time, they responded pretty much alike—a little slowly—to tests of the speed of their reactions.

"Obviously there is a difference in the way people behave while drinking," the professor who gave the parties pointed out recently. "But when people are of average size, as these all were, there is considerably less difference in their basic tolerance to alcohol."

The host was Dr. Leon A. Greenberg, then a physiologist on the staff of Dr. Howard W. Haggard, director of Yale's Laboratory of Applied Physiology and founder of the famous Center of Alcohol Studies, which is a division of the laboratory. When Dr. Haggard retired, this past summer, Dr. Greenberg took over. Because of his work with the Center during the last 15 years, he is one of the world's top authorities on what happens to alcohol when we drink it and what happens to us.

Toss off a jigger of whiskey and we'll follow it, with Dr. Greenberg's help.

IT GOES down with a burning sensation. (Take your liquor neat over the years, and you'll probably develop the hoarseness that gives rise to a whiskey tenor.)

In the stomach, the gastric juices immediately begin to dilute your drink until the concentration of alcohol drops from 50 percent, if the whiskey was 100 proof, to about five.

We'll assume that you haven't eaten. In that case, about a third of the alcohol passes almost immediately into the blood, entering it through tiny, thin-walled vessels, the capillaries, in the stomach's wall. The rest passes rapidly into the small intestine and is quickly taken up by the capillaries there. Alcohol is the only food absorbed this way—directly from the stomach and the intestines, without digestion. That's why it hits fast.

Next, it passes through the liver, where oxidation begins. This is the process that

Where are other Microsoft products?
Microsoft Word for Windows
Microsoft Excel for Windows

Qualities the Microsoft mouse of Word and Excel for Windows. Word for Windows is the word processor that's easy to learn and easy to use. It's the word processor that's so easy to use, it's easy to learn. Word for Windows is the word processor that's so easy to learn, it's easy to use. Word for Windows is

energy and the other 10 percent is eliminated in the urine and the breath.

IF YOU add water to your whiskey, you escape the burning sensation, but the alcohol gets into your bloodstream just as fast. If you mix the drink with soda water, it will get there even faster, because carbonation speeds the passage through the stomach—which explains why champagne goes to your head so quickly.

On the other hand, a can of beer contains about the same amount of alcohol as an ounce of whiskey but it won't be absorbed quite as fast, even if you take the whole can at a gulp. That's because beer and wine contain solid materials such as protein and carbohydrate, and these foodstuffs slow up the rate at which alcohol gets into the blood. Until it does get into the blood, it can't affect you.

That takes care of what you do to alcohol. Now, what does alcohol do to you?

Years ago, temperance lecturers had an answer: They dropped the white of an egg into a glass of pure alcohol, where it promptly turned into a hard and shriveled mass. Inside you, they implied, the same thing happened.

It isn't so. Even if you drank enough hard liquor to kill you, the concentration of alcohol in your blood and bodily tissues would be only about seven-tenths of one percent.

"That's far too weak," Dr. Greenberg explains, "to corrode or coagulate any part of you. You would die simply because alcohol is an anesthetic and you had taken enough of it to cause fatal anesthesia."

"It's not the alcohol in drinks that gives you a 'breath,' but the other ingredients. Ethyl alcohol has scarcely any odor. That's why it's hard to tell when someone has had a drink of U.S. vodka, which is simply distilled spirits, diluted."

The effect is similar to that caused by a shortage of oxygen at high altitudes. With alcohol, as with ether, it begins at the top of the brain—which is the center of fine judgment and coordination, the brake on our behavior—and works down.

How to Avoid a Hangover

1. Don't drink.
2. Eat a nourishing meal before you do any heavy drinking.
3. Fortify yourself with protein—a quart of milk or a steak—before a party. Protein takes longer to digest than other types of food, and as long as there is food in the digestive system, alcohol is absorbed less rapidly.
4. Don't drink too much wine. The tannic acid in wine can cause the worst hangovers of all.

SUPERFICIAL behavior while drinking depends on such points as how recently the drinker has eaten, whether or not he feels like celebrating, how much he wants to control his first reactions and what kind of temperament he has.

"The person who is shy when sober may become the life of the party when high," Dr. Greenberg notes, "and the usual life of the party may become a nuisance after a few drinks."

Does alcohol calm your nerves? The Center is in the midst of experiments to show whether or not a little alcohol—the amount found in two or three cans of beer—eases tensions. Many drinkers suppose that it does, and the experiments so far indicate that they are right.

Dr. Greenberg tells the story of the TV producer who ruined the point he was trying to make in a demonstration of the bad effects of alcohol. The producer put a man through a driving test twice in front of the cameras: first without a drink; then after two drinks and a pause.

"I could have told him what might happen," Dr. Greenberg says. "The driver at the start was in a strange situation and nervous. After a couple of drinks, he calmed down and made a better score than he had the first time."

Skills as well as tensions are lowered. A multitude of tests show that after

[Continued on page 232]

Winter's Wildest Highway Battle

Pitch, Heave and Cross-Wind Gales Make Cross-Country Trucking Hard Work, Dangerous Business—Jack-knifed Rigs Block Vital Arteries

By Wesley G. Mitchell

Winter's wildest highway battle was fought in Northern Ontario, Canada, when a blizzard swept the Trans-Canada Highway and the Canadian National Railway. Pitch, heave and cross-wind gales made cross-country trucking hard work, dangerous business. Jack-knifed rigs blocked vital arteries. Snowplows had their hands full. Trains were stalled. Motorists had to wait for the snowplows to open the highway. Here is the story of the battle, as told by Wesley G. Mitchell, who was there.

A LUMBERJACK'S HOME—MOUNTAINS OF
SOUTHERN OREGON—SNOW ON THE GROUND

This Car Can Crash Without Hurting You

Behind a massive door-to-door bumper, behind a car that takes the shock of a crash head-on, the Volvo 144 is a family car that can take a family safely through a crash and walk away.

By Gordon Sauer.

Two and a half years ago, automobiles in 1967 cost far less than they do today. Gasoline was cheaper. Insurance was cheaper. Life was cheaper.

Today, a 1967 Volvo 144 costs $2,800 and up, depending on how you want it equipped. Gasoline costs more than it used to. Insurance costs more than it used to. Life costs more than it used to.

Yet, for the price of a 1967 Volvo 144, you can still buy a family car that can take a family safely through a crash and walk away.

Volvo 144 cars are constructed so that the front and rear ends are designed to absorb the shock of a head-on collision. The front end is a massive door-to-door bumper. The rear end is a massive door-to-door bumper. The passenger compartment is a reinforced steel cage. The doors are reinforced steel. The roof is reinforced steel. The floor is reinforced steel. The seats are reinforced steel. The steering wheel is reinforced steel. The steering column is reinforced steel. The dashboard is reinforced steel. The windshield is safety glass. The rear window is safety glass. The side windows are safety glass. The seat belts are reinforced steel. The seat belts are safety belts. The seat belts are safety belts. The seat belts are safety belts.

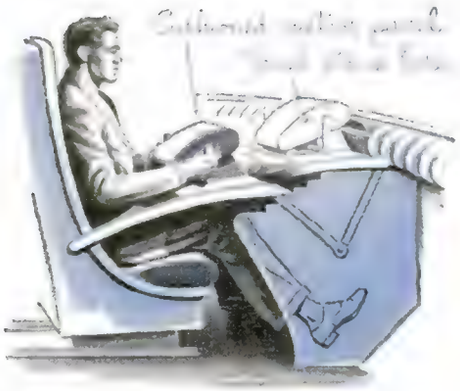
The Volvo 144 is a family car that can take a family safely through a crash and walk away.

The Volvo 144 is a family car that can take a family safely through a crash and walk away.

The Volvo 144 is a family car that can take a family safely through a crash and walk away

ROLLS-ROYCE

expects some people to ignore them. So there is also padding on the roof, above the windshield, and covering the dash. There is also extra-heavy padding at places you can butt into especially easily—on the roof just ahead of front and rear seats, for instance.



Controls protect driver instead of endangering him the way present ones do. Cushioned dashboard snaps into his lap. He steers with levers, which turn wheels hydraulically. Cornell reports that levers are easier to use than a wheel.

Cornell's research has differed from any before it. Most attempted only to prevent accidents. Cornell aims at that, too, but also tries to make crashes that do occur harmless to the people in the car.

Fact: The driver is alone in any car half the time. Besides, if he always has full control, he can avoid many crashes—and he can prevent many minor accidents from becoming major ones.

Device: The driver's seat is in the front center—not at the left-hand side. It is three inches ahead of, and three inches higher than, the other two front seats. This gives him better protection and visibility. The center driver's seat is, says Dye, "the most drastic change in the car."

Fact: Present wrap-around windshields let the driver see over a 110-degree angle. But he looks obliquely through the sharply curved ends, and his view there is distorted.

Device: A one-piece windshield smoothly curved—no sharp bends. The driver's eyes are in the center of the curve; he has almost a 180-degree view, and he looks straight through every part of the glass, never obliquely.

Fact: "The steering wheel and post," says Cornell's report, "constitute one of the most common injury-producing objects." The wheel rim and spokes are located where the driver's abdomen or head can strike them; the horn ring can break and "present dangerously sharp ends to the vulnerable throat." Lung punctures, crushed chests and broken necks have been common.

Bumpers circle the car, are rounded so bumps glance off. Springs and energy-absorbing material behind bumpers lessen impacts.

Dye is more blunt: "Today's steering post is a harpoon aimed at the driver's chest."

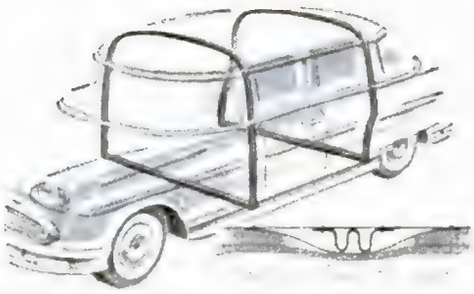
Device: A padded control panel replaces the steering wheel. It fits against the dash when the car is parked. You pull it down and click it into place in your lap to drive.

On each side of the control panel is a lever. You steer with either hand, moving one of these levers forward or backward. "Bobsled steering," Dye calls it. Steering is by power, and moving either lever three inches gives you the sharpest turn possible.

Cornell tests showed that this method of steering was also far easier to learn than the use of the wheel.

Fact: Protruding objects inside a car—keys, knobs, etc.—cause many injuries.

Device: Recessed buttons replace knobs. Radio controls are recessed in one side, shift buttons in the control panel itself. The ignition key goes at one end of the control panel, where no one can strike it.



Stock-car racers' roll-over bars are built inside Cornell car. They are bolted between roof skin and roof padding. You should be able to tumble into a ravine with nothing worse than a shaking-up.

Fact: Some accidents occur, the experts at the Cornell laboratory point out, because the driver's foot misses the brake pedal or slips off it.

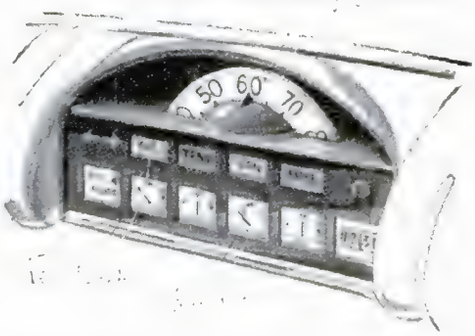
Device: The brake pedal is a wide bar that stretches two-thirds of the way across the control panel. You can reach it instantly and unmistakably with either foot or both.

The accelerator, the only other thing you operate with your feet, is where it is today: under your right foot.

Fact: A large share of collisions involve the front end.

Device: A front-view mirror where the rear-view mirror usually is. It looks ahead through a horizontal periscope running to each side of the car, lets you peek around the truck ahead without crossing the center stripe. Rear-view mirrors are out on each fender.

Fact: Some accidents happen when the driver takes his eyes off the road to check dashboard instruments.

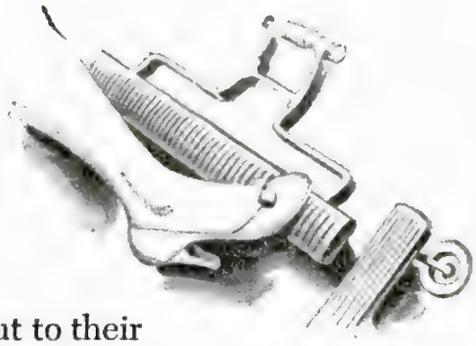


Only the speedometer is big. It has a fixed pointer and a moving dial. Other gauges have both dials and warning lights.

Device: A simpler instrument panel. In dead center is the only thing the driver needs to consult most of the time: the speedometer. Its needle is fixed in the center, and a numbered dial revolves. The driver glances at the same needle-point every time he checks his speed. "You can read the speedometer," says Dye, "with the least possible distraction from the road."

Beneath the speedometer are the other gauges: gas, oil, ammeter, temperature. Over each is a single bar that lights up. The bar normally glows green—when the gas tank is one-fourth or more full, for example. When trouble brews—as when the gas is low—the bar turns red to attract attention.

There are also a mileage indicator and a clock on the panel. The clock shows figures—like 5:28—instead of harder-to-read hands.



Nobody could miss this brake pedal—it stretches two-thirds of the width of the control panel.

Fact: Doors that open in crashes let people fly out to their death. Indiana police found one or both front doors had opened in 72 percent of fatal accidents. North Carolina and Maryland police reported the same thing happened in 44

[*Continued on page 254*]

The Washington Post
Friday, August 17, 1990

Biggest Jigsaw Puzzle Makers

Ravensburger's Jan Van Der Veen and Ingrid Van Der Veen with puzzle pieces

a Picture of Christ's World

Here is a picture of the land in which Christ lived. It is a land of hills and valleys, of rivers and lakes, of fertile fields and barren deserts. It is a land of great cities and of little villages. It is a land of rich people and of poor people, of good people and of bad people. It is a land of Jews and of Gentiles, of Romans and of Greeks. It is a land of Roman soldiers and of Roman officers, of Roman governors and of Roman emperors. It is a land of Pharisees and of Sadducees, of Herodians and of Zealots, of Essenes and of Sanhedrists. It is a land of Jewish priests and of Jewish rabbis, of Jewish scribes and of Jewish lawyers. It is a land of Jewish synagogues and of Jewish temples. It is a land of Jewish kings and of Jewish princes, of Jewish tetrarchs and of Jewish ethnarchs. It is a land of Jewish men and of Jewish women, of Jewish children and of Jewish babes. It is a land of Jewish fishermen and of Jewish farmers, of Jewish shepherds and of Jewish tax-gatherers. It is a land of Jewish publicans and of Jewish sinners, of Jewish Samaritans and of Jewish Gentiles. It is a land of Jewish Christians and of Jewish Christ-haters, of Jewish Christ-lovers and of Jewish Christ-worshipers. It is a land of Jewish Christ-crucifiers and of Jewish Christ-crucified. It is a land of Jewish Christ-rejecters and of Jewish Christ-accepters. It is a land of Jewish Christ-forsakers and of Jewish Christ-followers. It is a land of Jewish Christ-deniers and of Jewish Christ-confessers. It is a land of Jewish Christ-hiders and of Jewish Christ-seekers. It is a land of Jewish Christ-hunters and of Jewish Christ-finders. It is a land of Jewish Christ-hunted and of Jewish Christ-found. It is a land of Jewish Christ-hunted and of Jewish Christ-hunted-down. It is a land of Jewish Christ-hunted and of Jewish Christ-hunted-down and of Jewish Christ-hunted-down-and-killed. 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It is a land of Jewish Christ-hunted and of Jewish Christ-hunted-down and of Jewish Christ-hunted-down-and-killed and of Jewish Christ-hunted-down-and-killed-and-buried and of Jewish Christ-hunted-down-and-killed-and-buried-and-raised-from-the-dead and of Jewish Christ-hunted-down-and-killed-and-buried-and-raised-from-the-dead-and-ascended-into-heaven and of Jewish Christ-hunted-down-and-killed-and-buried-and-raised-from-the-dead-and-ascended-into-heaven-and-sitting-on-the-right-hand-of-God. 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Fig. 1. Ancient Egyptian sculpture of a man and his wife. The man is shown as a large figure, the woman as a small one. Egyptian women were treated as property, not as equals.

Fig. 2. Ancient Greek sculpture of a man and his wife. The man is shown as a large figure, the woman as a small one. Greek women were treated as property, not as equals.

Die Bergwerke 1.000 Meter unter der Erdoberfläche sind nicht mehr zu erreichen. Die Temperatur ist zu hoch. Die Bergleute müssen sich mit Kühlanlagen und Klimaanlagen vor der Hitze schützen. Die Temperatur ist zu hoch. Die Bergleute müssen sich mit Kühlanlagen und Klimaanlagen vor der Hitze schützen.

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Ah, Mr. Bunny, I'm so glad you've come to see me!
Oh, I'm so sorry, Mr. Bunny, but I'm not at home to anyone today.

What makes the pointers go around? How do you read them? Here's the inside story of

How Your Electric Meter Works

WHENEVER you turn on a lamp or appliance, a little aluminum disk in your electric meter revolves. It drives the pointers, on the meter dials, that tell how much electricity you use.

You can see the disk going 'round, in a slot at the front of the meter. To see more, you'd have to take the meter apart, and your electric company would take a dim view of that. But your meter's ingenious works are worth looking at, and the photos and diagrams on these pages show you what they're like.

Your meter measures kilowatt-hours of electrical energy. Ten hours' use of a 100-watt table lamp, for example, adds up to 1,000 watt-hours or one kilowatt-hour. Of course your meter doesn't know or care whether you use the energy in a lamp, a heater, or a power tool. It just does the tallying.

Two sets of connections tell the meter what it does need to know: how many amperes of current you're drawing from the wires, and the voltage of the electricity entering your home. All the current you use passes first through the meter's "ampere coil," a turn or two of heavy wire, which is connected in series with the household wiring. Connected across the power-supply wires is the meter's high-resistance "voltage coil," of many turns of thinner wire.

Heart of the meter is a small induction or eddy-current motor. The meter's revolving disk, of solid aluminum, forms its rotor. A pair of electromagnets, whose windings are the ampere and voltage coils, make up its stator. C-shaped permanent magnets provide a brake, overcome by the driving force.

What results is a midget mechanical brain, beautiful in its simplicity, that solves the familiar equation: *watts* = *volts* × *amperes*. For the ampere and voltage coils' combined effect turns the disk at a speed exactly proportional to the number of watts you're using.

Every revolution of the disk indicates an exact number of watt-hours consumed. In the modern AC meter pictured here, one revolution equals 3.6 watt-hours. So, to register one kilowatt-hour, the disk revolves 277 7/9 times.

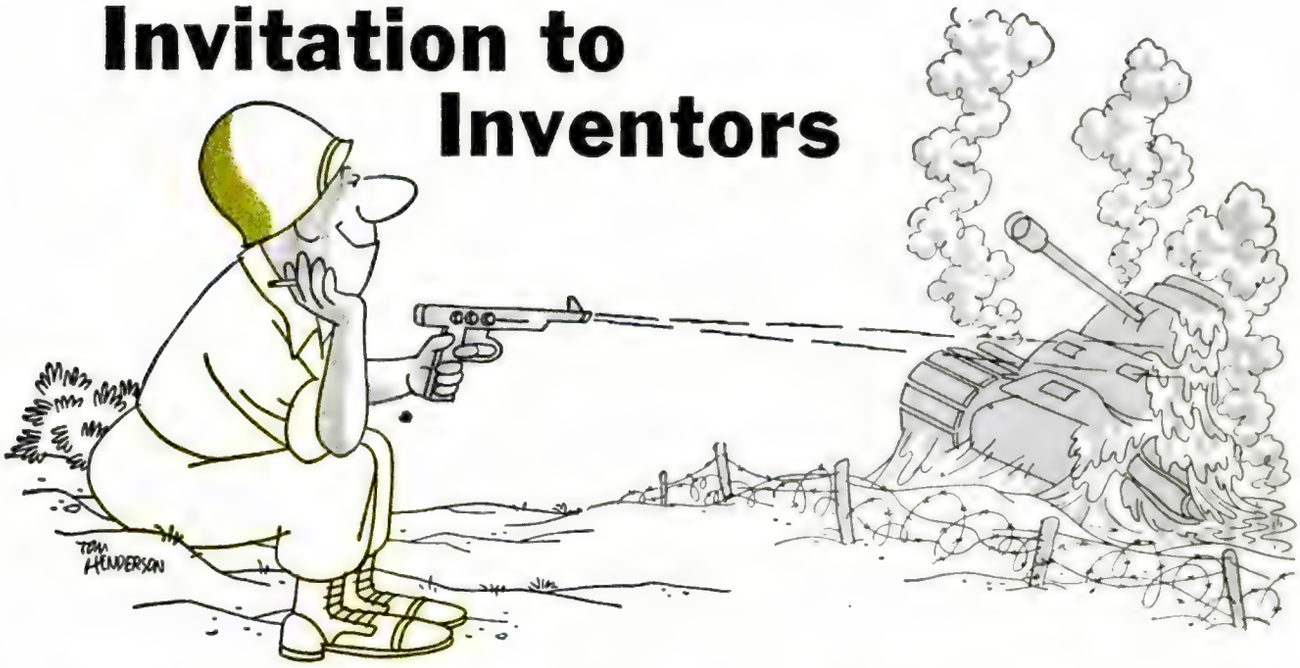
Today a typical household AC meter has a rated capacity (although it doesn't mind a substantial overload) of 15 amperes at 240 volts, which is equivalent to 3,600 watts. That much wattage spins the disk at 1,000 revolutions per hour or 16⅔ r.p.m., just half the speed of an LP record player's turntable. A 200-watt electric blanket or ventilating fan turns the disk at less than one r.p.m., slower than the second hand of your watch.

For accurate response to modest wattages, friction must be all but eliminated. Westinghouse mounts the meter's disk on sapphire jewel bearings; General Electric, with a permanent-magnet suspension that floats it in air. Almost negligible is the friction of the pointers' gearing, and air resistance to the disk's spinning. But even so delicate a mechanism as

Bottom view of the Lady's Slipper showing the lip, the two petals and the three sepals.

Lady's Slipper, Cypripedium Calceolus, Linnaeus. Flowering Stem, Leaf, Root, Seed Capsule, Seed, Flower Section, Pistil, Stamen, Petal, Sepal, Lip, Ovary, Pollinia, Stigma, Pollen Grains, Ovule, Embryo, Seedling

Invitation to Inventors



A NEWLY revised list of things the armed forces would like to see invented includes 245 items, from simple fasteners to an entirely new concept of communication that doesn't depend on electrical impulses, electromagnetic waves, or sound.

Inconspicuous rocket. The list is a frank appeal for the "creative layman" to put on his thinking cap. New weapons are not what the Army, Navy and Air Force are mainly looking for—although they would like, say, a rocket that fires without noise, flash or smoke. Many items are things we'd all like to see 'em make, such as a device to deflect rain from windshields without impairing the vision of a pilot—or the man behind the wheel of the family car. Or a gadget that would serve as a bolt without needing the usual amount of turning. Or a chemical that would rapidly melt coatings of ice or snow at temperatures around 65 degrees below zero.

Many needs reflect spreading military operations in the Arctic: a sleeping bag in which a sleeping man could turn over without awakening; a device, not a mask, to protect a man's head and face in extreme cold; a substitute for wolverine fur as the ruffing on the hood of a parka; a device that would quickly anchor guy wires in ice or frozen ground.

Automatic smeller. The military is also nosing around for an odor-analysis device that will be an improvement over sniffing. The object is to find ways of ignoring simply obnoxious smells, while leaving detectable such valuable alarm odors as leaking gasoline. Also wanted in this category are simple, lightweight devices to indicate the presence of carbon monoxide or to signal the danger of unconsciousness from the lack of oxygen.

There is variety in the desires of the military:

- An airplane paint that reflects heat while still being highly resistant to it.
- A permanent anti-static coating for plastics.
- Something to protect stainless steel from oxidation at temperatures above 2,000 degrees.
- Lightweight sound-absorbing material that would also serve as armor plate and insulation.
- Luminous material that will glow without external excitation.
- A "fatigue detector" that would tell in advance when a highly stressed metal part is getting ready to break.

Then, of course, there is always the death ray, which still hasn't been invented. It should be small, use little power, and be effective at 500 yards.

If you have any ideas along these lines, or want to know more about what inventions are wanted, write to: The National Inventors Council, U. S. Department of Commerce, Wash., 25, D. C.

37 Marks the Frame in the New Caddy

Ship's Cat Tabby, Ship's Dog Bosun, and Ship's Rat Scurvy Pete, are the ship's mascots. Tabby is a tabby cat, Bosun is a mongrel dog, and Scurvy Pete is a rat. Tabby is a female cat, Bosun is a male dog, and Scurvy Pete is a male rat. Tabby is a kitten, Bosun is a puppy, and Scurvy Pete is a rat. Tabby is a cat, Bosun is a dog

Buick Puts New Wrinkle in Torque-Tube Drive

By Steven Fossum

Buick's new torque-tube drive, which is being used on the Buick Special, Skylark, Wildcat and Riviera models, is a variation of the Hotchkiss drive. In the conventional Hotchkiss drive, the torque tube is rigidly attached to the rear axle housing and the rear axle housing is free to move in the vertical plane. In the Buick drive, the torque tube is free to move in the vertical plane and the rear axle housing is rigidly attached to the torque tube.

Buick's Torqueflite automatic transmission is rigidly attached to the torque tube. The torque tube is free to move in the vertical plane with respect to the frame. The torque tube is rigidly attached to the rear axle housing

Chrysler and Imperial—the '57 Models
Chrysler Corporation, Detroit, Michigan

Chrysler Corporation's Imperial Division has a new Crown Imperial Limousine for 1957 with a 413 cu. in. displacement engine. The Crown Imperial Limousine is the only Imperial

Fuel injection system, with its distributor, fuel pump, and injectors, is shown in the engine compartment of the Mercedes-Benz 300SL.

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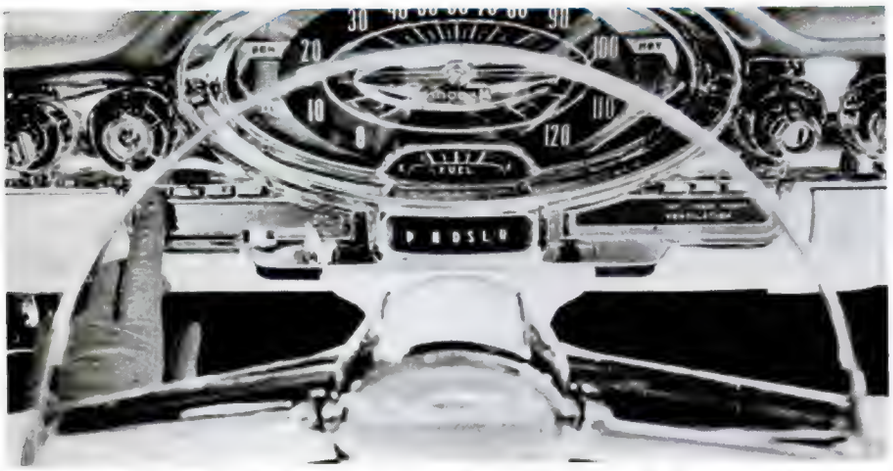
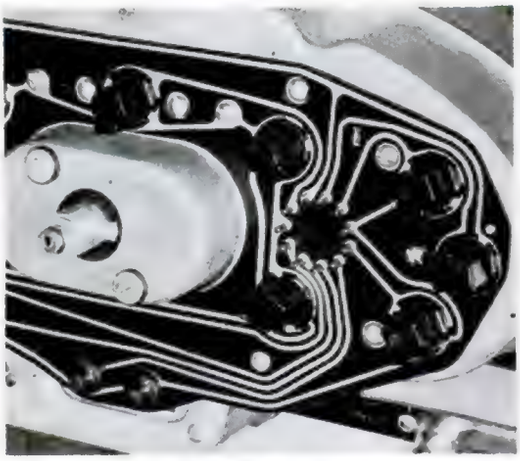
Picture Tour of the

Last month, in the lower Michigan peninsula city of Lansing, the wraps came off the 1957 Oldsmobile. It's all new . . .

. . . from grille, flanked by . . .



There are a lot of little surprises (such as push buttons for heat and ventilation) on a smart new panel behind a thin-rimmed steering wheel that has been deep-dished for safety . . .



. . . printed electrical circuits, replace troublesome wiring . . .

The differential is more rugged to take care of a 400 foot/pound torque, and the Super 88's axle ratio was changed from 3.23:1 to 3.42.

But the big change in the back end was moving the shocks outboard of the springs for better "wheel control" on bumps and less sway.

'57 Oldsmobile

How Pontiac Lost

Pontiac's power, like the Chieftain's, is now available in economy models.

THE Pontiac Chieftain is now available in economy models. Pontiac's power, like the Chieftain's, is now available in economy models. Pontiac's power, like the Chieftain's, is now available in economy models. Pontiac's power, like the Chieftain's,

The Stringers

STRINGERS are the long fore and aft members of the hull structure. They are fastened to the frames and to the plating. Stringers are made of steel plates and angles.

New German Luxury Liner Cruises Texas Highways

F.J. Kreis is president of Kreis Motor Corporation, Houston, Texas, distributors of Setra buses. Kreis is also president of Setra Corporation, which is the parent company of Setra. Setra is the world's largest bus manufacturer. Kreis is president of the Texas Motor Coach Association and president of the Houston Chamber of Commerce.

Although it was built for Bad Homburg, Germany, the Setra luxury liner is equipped with air conditioning, toilet, lounge, and kitchen facilities. Kreis is now using it to cruise Texas highways.

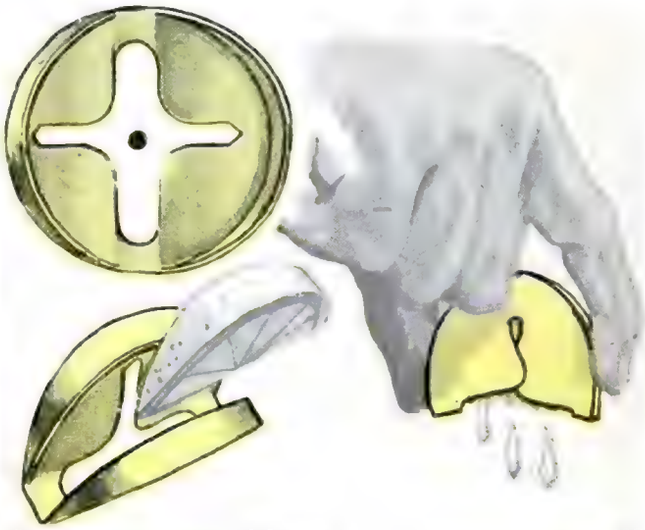
Kreis and Setra luxury liner

New Ideas from the Inventors

1 Dolly to Ease Engine Work. Supported by this platform "creeper," a mechanic could reach some parts of a modern car engine more easily with fewer acrobatics. A tray attached to the dolly would keep his tools within reach. The dolly could be wheeled into position and moved about easily on its castered base.

2 Suitcase to Hitch a Ride. This piggyback case would keep small travel articles handy. It could be carried separately, but when you wanted to simplify luggage handling, you could snap-fasten its strap to the handle of another suitcase as shown in the drawing below.

3 Squeezer to Tame Lemon Juice. Folded over a wedge of lemon, this disposable paper collar would let you squeeze the juice out without getting your fingers wet. Lapping over the sides of the slice, the paper would also block upward, face-spattering squirts.



Please turn the page for more new ideas

Blow Down Gauge Cock Pin Installation

Figure 1. Blow Down Gauge Cock Pin Installation

1. Remove the gauge cock pin from the blow down gauge cock.
2. Insert the gauge cock pin into the hole in the blow down valve handle.

"Paradise is the World of Illusion," wrote a sect of Indian Buddhists in the 1500s. Perhaps the world's most magnificent metaphors, Indra's Net, is a vision of "illusion" and "paradise" in the sense that it describes the vast expanse of wonders that issue from seemingly ordinary beings and events. The Indra's Net metaphor is a vision of a net of pearls, each of which reflects all the other pearls in the net. The Buddhist Avatamsaka Sutra (Sanskrit: Gandavyuha) describes the Indra's Net metaphor as follows:

> Imagine a vast net of pearls, stretching out in all directions, and extending to infinity. Now, imagine that one of the pearls in the net is a mirror, and that it reflects all the other pearls in the net. Now, imagine that each of those pearls in the net is also a mirror, and that each one reflects all the other pearls in the net, including the pearl that reflects all the other pearls in the net, including the pearl that reflects all the other pearls in the net, including the pearl that

Picture News
IN THE WORLD OF SCIENCE

Glowing Taillight Guides New Antitank Rocket to Target

STEERED ON its course by remote control, the Dart, newest of the Army's tank killers, has the explosive power to destroy a heavily armored tank with a single hit. A fiery sodium flare, spewing in its tail, helps the missile-age cannoneer track the rocket to its goal.

Copyright

Experimental Show Transport by a Mack Bonnet Top Tractor.
Mack Bonnet Top Tractors are used by the Ringling Brothers Barnum & Bailey Circus for transporting their famous show equipment. Mack Bonnet Top Tractors are also used by the Ringling Brothers Barnum & Bailey Circus for transporting their famous show equipment.

Experimental Show Transport by a Mack Bonnet Top Tractor and Semi-Trailer.
Mack Bonnet Top Tractors are used by the Ringling Brothers Barnum & Bailey Circus for transporting their famous show equipment. Mack Bonnet Top Tractors are also used by the Ringling Brothers Barnum & Bailey Circus for transporting their famous show equipment.

Mr. Eugene Wendell Ely's Cliff, Top Of Mount Ararat

Mr. Eugene Wendell Ely's Cliff, Top Of Mount Ararat. Mr. Ely's Cliff is the highest point on Mount Ararat, 14,000 feet above the sea. Mr. Ely's Cliff is the highest point on Mount Ararat, 14,000 feet above the sea.

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Mobile Crane Used for Lifting Concrete Blocks Mobile crane used for lifting concrete blocks for the Ohio River Bridge at Cairo, Illinois.

Crane Lifts 5 Tons Block Weight Crane lifts 5 tons block weight for the Ohio River Bridge at Cairo, Illinois.

Mobile Crane Used Where Building Will Stand Mobile crane used where building will stand.

Mobile Crane Used Where Building Will Stand Mobile crane used where building will stand.

New Timing System Records Speed of Air Trophy Winner

Two new Bowen cameras at each end of the course timed Commander R. W. (Duke) Windsor in the Chance Vought F8U-1 Crusader above when he won this year's Thompson Trophy. He set a U. S. mark of 1,015.428 m.p.h. with the Navy entry. Each of the paired cameras, pointing straight up as at left, recorded the flight on a film strip moving behind a revolving shutter. It shot 30 negatives a second, exposing each 1/25,000 second.

Statuary Garden, Hampton Court, Surrey. Photo: Country Life. Designed by Sir Christopher Wren, the Statuary Garden was laid out in 1702 for Queen Anne. The lead statues are by Tijou and Cibber. The Queen's Gallery, which overlooks the garden, was built by Wren in 1700 and was used as a picture gallery by William III.

Lifting Force. In a Wind Tunnel Measuring Machine

Machine shown here is used in the Wind Tunnel of the Aerodynamic Laboratory, Washington Navy Yard, for measuring the lifting force on models. Lifting force is measured by means of a balance system. The machine is used for measuring the lift of airplane models, airship models, and other objects.

Big Wind Blows Off Its Roofing. Wind, the force of which was estimated at 100 miles an hour, blew off the roofing of the Brooklyn Bridge Power Station, Brooklyn, N. Y., on the night of March 12, 1927. The roofing was blown off in sections, and was carried over the Brooklyn Bridge and dropped in the East River. The roofing was made of tar paper and was 3 years old. The power station is located at the Brooklyn end of the bridge.

Mrs. Ann Bancroft, who plays the Miracle Worker, and Patty Duke, who plays Helen Keller, in a scene from the movie version of William Gibson's play, "The Miracle Worker," which opens here next week. Miss Duke, who is blind, was taught by Miss Bancroft, who is not blind, to sign the lines of her part. Miss Duke, who is not blind, was taught by Miss Bancroft, who is not blind, to read the lines of her part in Braille. Miss Bancroft, who is not blind, was taught by Miss Duke, who is blind, to read the lines of her part in Braille. Miss Duke, who is

Revolving Door Varies Speed for Slowpokes or Eager Beavers

A TWO-SPEED motor turns this revolving door at a constant no-hands three r.p.m. as the bundle-laden lady goes through. Pressure on a push bar shifts it to nine r.p.m. Still more pressure operates an over-riding clutch (diagrammed at bottom) for manual pushing of the International Steel Co. door up to 12 r.p.m.

Copyrighted ma

Ancient Egyptian boat with a sail made of papyrus. The Egyptians used papyrus for many purposes, including as a material for writing on and as a material for building boats. Papyrus was a plant that grew in the Nile River and was harvested by the Egyptians. The papyrus was woven into mats and used to make the sail of the boat. The papyrus was also used to make the hull of the boat. The papyrus was a very important plant to the Egyptians and was used for many purposes.

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Copter Carries Along Its Own Hangar in a Blow-Up Bundle

THE Sycamore need never be without a roof over its rotors. As the British helicopter lands (top photo) a 192-pound package is unloaded and spread out on the ground (center). An electric blower takes only five minutes to inflate 12-inch-diameter, built-in tubes, forming arches to support the fabric shed above.

Dr. Ernst Ruska, the inventor of the electron microscope, with a model of the electron microscope he built in 1933 and 1934. Ruska's electron microscope was the first to surpass the resolution of the light microscope.

Bottom: Dr. Ernst Ruska's electron microscope, which was the first to surpass the resolution of the light microscope, in the Fritz Haber Institute, Berlin, Germany.

Photo by Ansel Adams, 1941. Adams's photo of Manzanar, taken from a watchtower, shows the barbed wire fence surrounding the camp. Adams was hired by the War Relocation Authority to photograph the internment camps. Many of his photographs were confiscated by the military and never released to the public.

New Aids to Living

Electric Shaver Cleaner

Cleans shaver in 3 seconds. Lasts 3 months. Costs 1 cent a day. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Curler

Curls hair in 3 minutes. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Dryer

Dries hair in 3 minutes. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Brush

Brushes hair in 3 minutes. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Cutter

Cuts hair in 3 minutes. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Shaper

Shapes hair in 3 minutes. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Waver

Waves hair in 3 minutes. Sold by Sears, Roebuck and Co. Price $1.

Electric Hair Curler

Curls

Atomic Freighter

Atomic freighter is powered by a nuclear reactor, which heats water to produce steam for the turbines.

Planned in England

Tower Bridge
Tower Bridge
Tower Bridge

Our Pixes an Egglomerator

Jeff Hurst
Jeff Hurst@Pixelsoft.com

Figure 1. Cross section of the Mercury-Redstone launch vehicle.

Figure 2. Cross section of the Mercury-Atlas launch vehicle.

Figure 3. Cross section of the Gemini-Titan launch vehicle.

Figure 4. Cross section of the Apollo-Saturn launch vehicle.

Figure 5. Cross section of the Apollo-Saturn launch vehicle.

Figure 6. Cross section of the Apollo-Saturn launch vehicle.

Figure 7. Cross section of the Apollo-Saturn launch vehicle.

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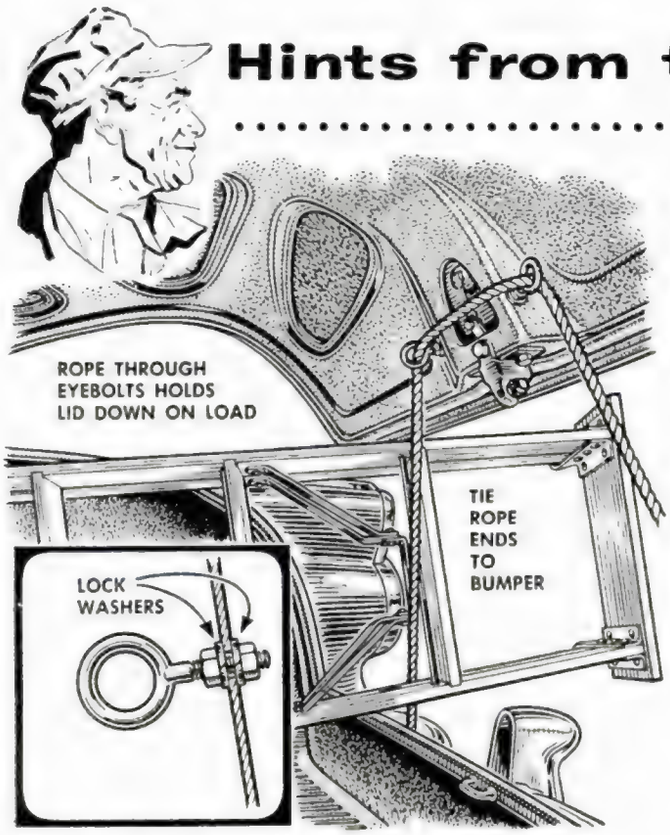
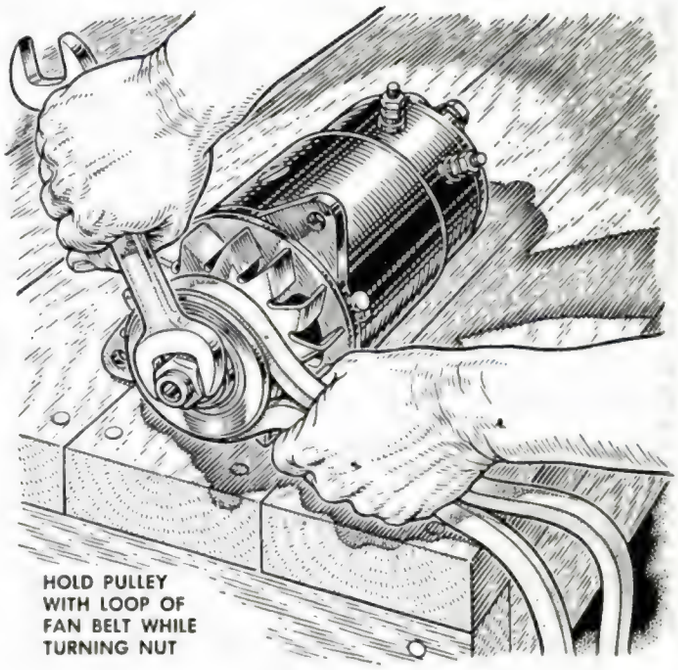
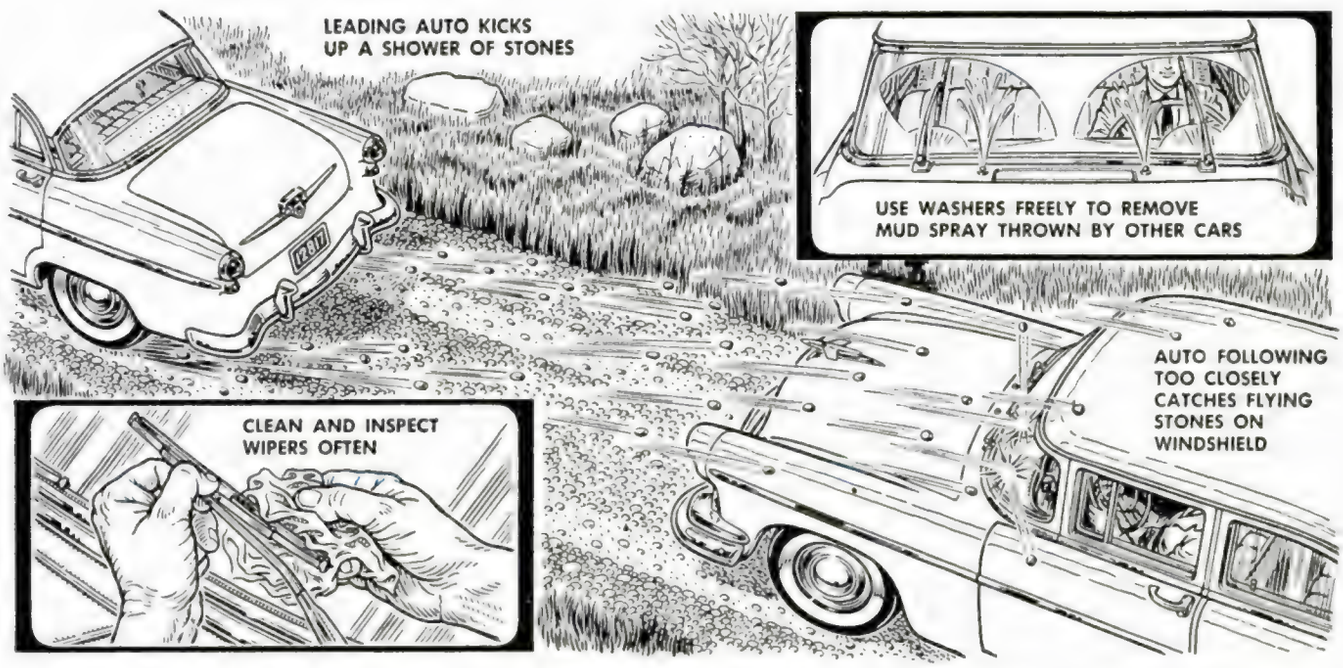
Hints from the Model Garage



Tie the car trunk lid down on loads that hang over, by threading a rope through two eyebolts installed on the inner frame of the lid. Drill holes to fit the bolts and lock them in place with double nuts. Tie the rope to the bumper.



To remove a generator pulley without damaging it, loop the fan belt around the groove and grip it firmly while you loosen the nut. If the nut is stubborn, use an old fan belt and lock it in a vise to get a tighter grip on the pulley.



Modern windshields are expensive. Here are three ways to safeguard yours:

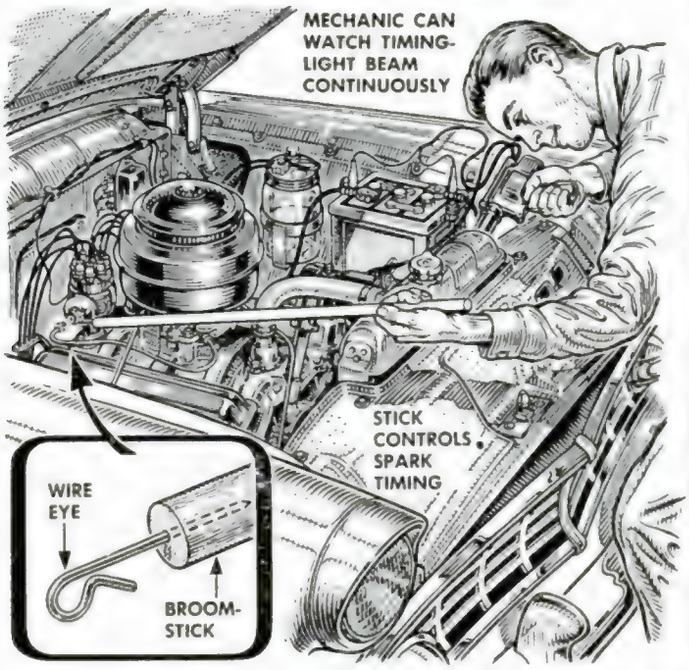
Use your windshield washer to flush dirty road spray thrown up by other cars, and use wipers briefly. Glass is hard, but grit particles are even harder.

Keep your distance when following another car on an unimproved road. The other fellow's tires may hurl stones or sand, marking or fracturing your glass.

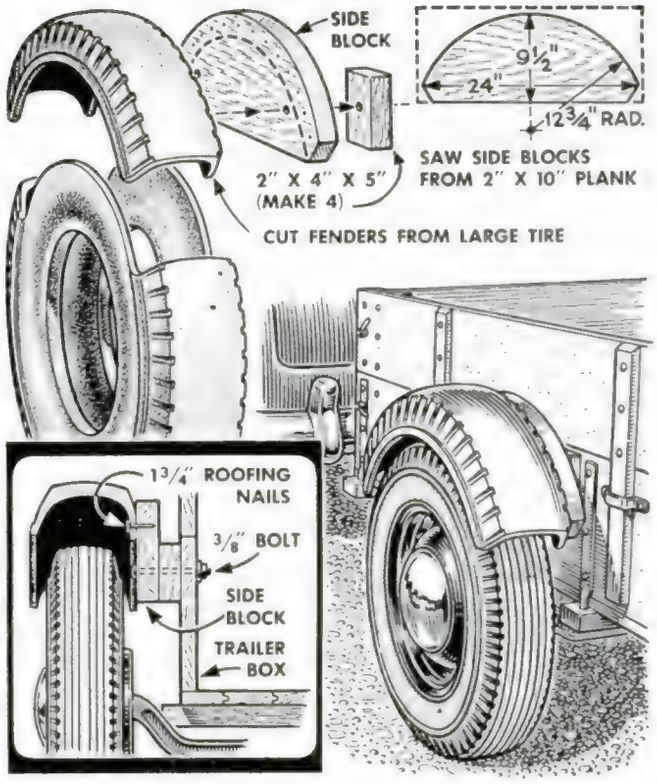
Clean wiper blades often, see that they make contact and have not hardened.

Please turn the page for more auto hints

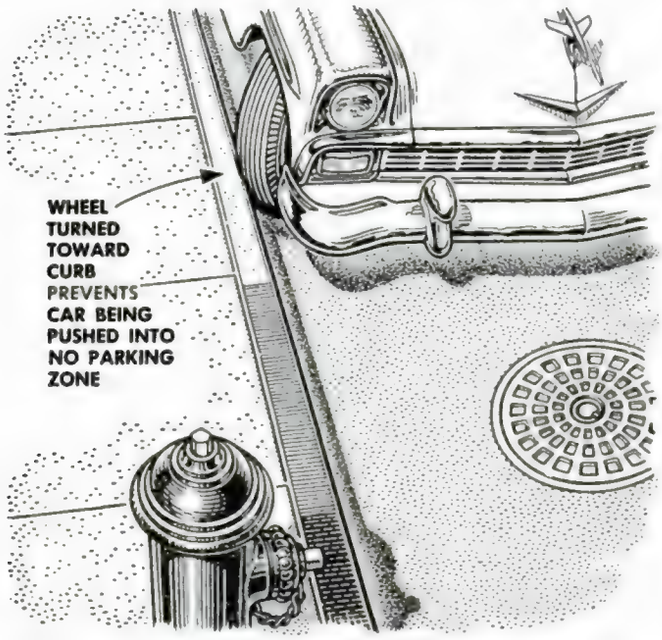
More Hints from the Model Garage



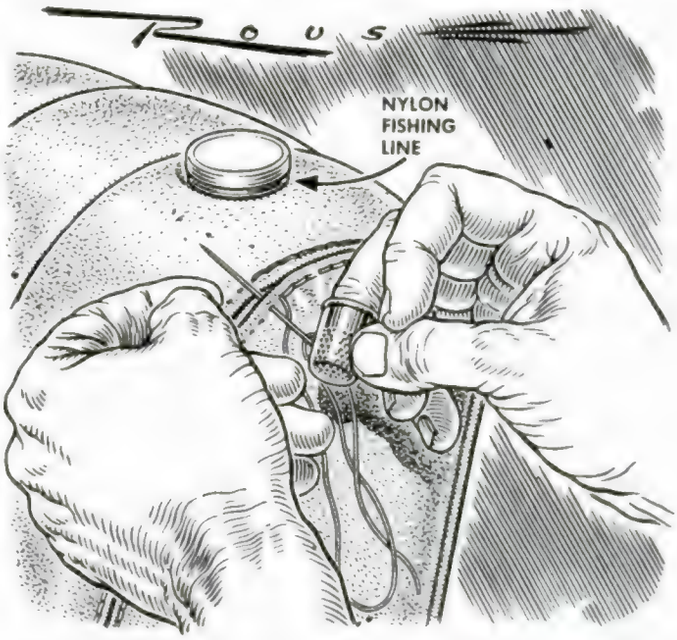
When timing an engine that has the distributor at one end and timing mark at the other, use a stick with a wire eye pressed in it to rotate the distributor body while you beam the timing light on the mark. Disconnect the vacuum line for accurate timing and slip the eye over the fitting on the diaphragm housing.



Make your own trailer fenders to keep the wheels from throwing mud all over your car. Cut segments from a truck tire (7.50 x 17 is a good size) and nail them to blocks bolted to the trailer sides. Use blocks thick enough to position the fenders over the wheels, and set the fenders high enough to allow for spring action.



Don't let a "wise guy" push your car ahead into a fireplug area or no-parking zone to make room for his car. Turn your wheels toward the curb when near such a spot and then you'll be sure to find your car right where you left it.



Stitch open seams in slip covers or car upholstery with nylon fishing line. It comes in several colors, and line rated at 12 to 15 lb. test is hard to break. An upholsterer's needle will make stitching seams on flat surfaces easier.

Installing Modern Switches and Outlets

By Jim Tolpin

Jim Tolpin is a carpenter and author of several books on woodworking and woodwork. He lives in Ann Arbor, Mich.

You don't need to be a professional electrician to install a new switch or outlet. Most of the work involved in installing a switch or outlet is carpentry, not electrical work. Once you've installed the box and run the cable, the electrical work is simple. Modern switches and outlets are designed to be easy to wire, and they are very safe. Most of the time, you can simply plug the wires into the back of the switch or outlet and tighten screws to complete the connection. Alternate methods, such as using screw terminals, are also very safe and easy to use.

Before you begin, be sure you understand the electrical system in your home. Read the section on electrical safety in your owner's manual, and be sure you understand how to shut off the power to your home. Be sure you have a working knowledge of the electrical system in your home before you begin any work. Be sure you have a working knowledge of the electrical system in your home before you begin any work. Be sure you have a working knowledge of the electrical system in your home before you begin any work.

Mit einem Kreuzschlitzschraubendreher wird die Schraube (Pfeil) gelöst. Die Schraube ist nicht verloren zu gehen.

Die Schraube wird wieder eingesetzt und festgezogen.

Die Kontaktfedern müssen sauber und fettfrei sein. Sie können mit Spiritus gereinigt werden

Dr. Ernest Ashton, Professor of Physics at Cambridge University, and his wife, Dr. Ruth Ashton, Professor of Physiology at Cambridge University, are shown in their laboratory.

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Bins For the Handyman

WHEN YOU WRITE FOR INFORMATION ABOUT THIS ADVERTISEMENT, PLEASE MENTION THE NAME OF THIS MAGAZINE
WHEN YOU WRITE TO ADVERTISERS, PLEASE MENTION THE NAME OF THIS MAGAZINE

Blow That Stump Down!

Blasting Powder, Dynamite, Electric Blasting Caps, Fuse, Caps, Exploders, Blasting Machines, Blasting Supplies, Tools, Etc.

Write for Catalog and Price Lists

Hercules Powder Company
Wilmington, Delaware

Fig. 1. Ventral view of the holotype of *Ceratocanthus* (*Ceratocanthus*) *Ceratocanthus* sp. nov. (MNHN-F-A 30 [illegible]). Scale bar = 1 mm.

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Science

Volume 1 Issue 1

Publication Date: 1880-01-01

Publisher: Science Publishing Co.

Place: Lancaster, PA

Pages: 1-16

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Source: Hathi Trust

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Generated on 2025-04-18 18:00 GMT / https://hdl.handle.net/2027/uc1.31822037396338

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Cover: Mary Ann Sullivan, 1 Dance Company, Photo: Lynn Lane

Inside Cover: Dance Company, Photo: Lynn Lane

1 Dance Company

Workface Workshop

by Ian Ng

Aluminum tubing is cut to length with a hacksaw. Clamp the tubing in a vise and use a file to remove burrs and sharp edges.

Joining Aluminum Tubing Is Easier Now

NEW tools and techniques have made it easier than ever before to join aluminum tubing. Aluminum tubing is used in many home projects, such as boat trailers, ladders, and sawhorses. Aluminum tubing is cut to length with a hacksaw. Clamp the tubing in a vise and use a file to remove burrs and sharp edges.

Aluminum tubing is joined by using a special tool to flare the end of one piece and a special fitting to connect the two pieces.

Aluminum tubing is joined by using a special tool to flare the end of one piece and a special fitting to connect the two pieces.

Now the Easier Wood Joints Are Strong, Too

Glues, or no glues, or pegs, or screws, very soon. Joints made with Tenon Cutter are strong, tight, and ready for use as soon as the glue is applied. Tenon Cutter makes tenons and mortises in one operation.

ARMA UNIVERSAL

PEARSON REDUCATION

ANALYSIS OF CONTINUOUS DISTRIBUTIONS

Figure 1.1 Cross section of a typical cell

Cell membrane (plasma membrane) is a thin layer of protein and fat molecules which surrounds the cell. It controls what goes in and out of the cell. Cytoplasm is a jelly like substance in which the cell organelles are suspended. Nucleus is a large organelle which controls the cell's activities. It also contains the genetic material (DNA) which carries information for the cell to make proteins. Mitochondrion is a small organelle which is the site of respiration. It provides energy for the cell to carry out its activities.

Figure 1.2 Cross section of a typical plant cell

Cell wall is a rigid layer of cellulose which surrounds the cell. It gives the cell its shape and protects it from damage. Vacuole is a large organelle which contains cell sap. It helps to keep the cell firm. Chloroplast is a small organelle which contains chlorophyll. It is the site of photosynthesis.

Fig. 1. Complete set of equipment for the Bacteriological Laboratory, Ward Tent, Mobile Medical Unit, Mobile Medical Unit Tent, Mobile Medical Unit Trailer, Mobile Medical Unit Trailer Tent, Mobile Medical Unit Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer, Mobile Medical Unit Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment Trailer Tent Equipment

Ultra-violet photography of the Moon's surface, taken with a Cassegrain telescope and a Lallemand electronic camera. The Moon's surface is covered with a layer of very fine dust, which is thought to be the result of meteorite impacts. The dust is composed of fragments of rock and glass, and is thought to be the result of the impacts of meteorites on the surface of the Moon. The dust is thought to be the result of the impacts of meteorites on the surface of the Moon. The dust is thought to be the result of the impacts of meteorites on the surface of the Moon.

Fig. 1. Cross section of the Cockcroft-Walton generator. The generator is mounted on a pedestal and is provided with a rotating arm for the purpose of adjusting the position of the tube. The tube is supported by a wooden frame

Ann Sheridan, Dennis Morgan, Jack Carson, Alexis Smith, Eve Arden, Paul Kelly, Joyce Reynolds, Ann Vickers, Ann Rutherford, Jane Wyman, Ann Dvorak, Ann Blyth, Ann Doran, Ann Miller, Ann Harding, Ann Southern, Ann Rutherford, Ann Sheridan

Using Three Blades for Faster Saw Jobs

Bill Hansen, Contributing Editor

Most people think of a circular saw blade as a single blade. But there are two other blades that can be used on a circular saw. Dado blades are used to make grooves in wood, and they are made up of two blades and a number of chippers

BOOKPRESS

Bookpress

Bookpress is a simple machine for pressing books. It is made of two boards and four screws. The boards are made of wood and the screws are made of metal. The machine is used to press books after they have been printed and bound. The machine is used to press books after they have been printed and bound. The machine is used to press books after they have been printed and bound.

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Ancient Egyptian Medicine

Egypt was the most ancient of all the nations of which we have any knowledge. Its history goes back to the dawn of civilization. Its people were the first to write, to build, to make laws, to practice medicine, to make pottery, to weave cloth, to make glass, to make paper, to make ink, to make pens, to make paint, to make boats, to make wagons, to make chariots, to make swords, to make spears, to make bows and arrows, to make shields, to make armor, to make musical instruments, to make jewelry, to make furniture, to make tools, to make baskets, to make mats, to make ropes, to make nets, to make fishing rods, to make hooks, to make sickles, to make hoes, to make plows, to make axes, to make saws, to make chisels, to make hammers, to make nails, to make screws, to make locks, to make keys, to make boxes, to make chests, to make tables, to make chairs, to make beds, to make lamps, to make candles, to make oil, to make wine, to make beer, to make bread, to make cheese, to make butter, to make milk, to make honey, to make sugar, to make salt, to make pepper, to make spices, to make perfumes, to make cosmetics, to make medicine, to make poisons, to make antidotes, to make amulets, to make talismans, to make charms, to make spells, to make incantations, to make prayers, to make sacrifices, to make offerings, to make temples, to make tombs, to make pyramids, to make sphinxes, to make obelisks, to make statues, to make paintings, to make hieroglyphics, to make mummies, to make sarcophagus, to make canopic jars, to make funerary boats, to make funerary figures, to make funerary masks, to make funerary papyrus, to make funerary stelae, to make funerary boxes, to make funerary chests, to make funerary tables, to make funerary chairs, to make funerary beds, to make funerary lamps, to make funerary candles, to make funerary oil, to make funerary wine, to make funerary beer, to make funerary bread, to make funerary cheese, to make funerary butter, to make funerary milk, to make funerary honey, to make funerary sugar, to make funerary salt, to make funerary pepper, to make funerary spices, to make 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of the old Jewish Quarter of Hebron, the Arab Quarter of Jerusalem, and the Jewish Quarter of Safed. Jerusalem's Old City was taken by the Jordanian Legion, which had been trained by British officers and was equipped with British weapons. The Jordanian Legion was the only Arab force that was able to hold its own against the Israeli forces. The Israeli forces had been trained by British officers and were equipped with British weapons. The Israeli forces had been trained by British officers and were equipped with British weapons. The Israeli forces had been trained by British officers and were equipped with British weapons

ملك الله ما يشاء ويخلق ما يشاء
يهب لمن يشاء إناثا ويهب لمن يشاء الذكور
أو يزوجهم ذكرانا وإناثا ويجعل من يشاء عقيما
إنه عليم قدير

Allah has dominion over what He wills. He creates what He wills. He gives to whom He wills females and gives to whom He wills males or He makes them both male and female and makes whomever He wills barren. He is Knowing and Capable.

How to Choose the Right Tone Arm

REPORT

Just a support to hold the pickup? Yes, but everything about it affects the music you hear.

By Hubert Luckett and Martin Mann

YOU may be chewing up five-dollar bills. With the tone arm on your record player, that is. An LP record costs the better part of five bucks, and a few plays with an inadequate tone arm will rip out the fine music you bought.

That's one reason it doesn't pay to skimp on the arm. It and the pickup cartridge (PS, Nov., p. 214) are the only hi-fi components that can hurt your investment in records.

There's another reason, too. The arm has what seems a simple job: to support the pickup while the stylus moves from the starting to the finishing grooves of the record. This has a lot to do with the quality of the music you hear. The arm must be rigid enough to resist twisting, have inertia enough to hold the cartridge still while the stylus vibrates, and be light enough to glide easily over warped records. Most important of all, it must hold the pickup in correct relationship to the groove—a problem with no easy answer.

POPULAR SCIENCE compared specifications for 11 quality tone arms. Some of the specs we measured ourselves, others came from the manufacturers. We played all the arms. We found differences that a shopper should know about.

A problem in geometry. The cutter that records music is moved across the record blank by a lathe screw. It travels in a straight path—a radius of the record—with its axis tangent to every groove it cuts. Ideally, your tone arm should hold the pickup cartridge so that it moves exactly the same way—along a straight-line radius of the record with its axis perpendicular to the radius and tangent to every groove. (See the detailed sketches on page 179.) Then the stylus would be vibrated the same way that the cutter vibrated, and music would come off the record sounding the same as it did when it was put on.

Most tone arms cannot do this. They are pivoted at one end and swing the pickup in an arc, not a straight line. So they hold the pickup at an angle to most grooves instead of tangent to them. This angle is what engineers call tracking error. It varies from groove to groove as the pickup swings through its arc.

Longer arms? The problem could be virtually solved if you had room for a very long tone arm, with an effective length of three or four feet. It would still swing the pickup in an arc, but the short arc across the record would be very flat, almost a straight line. Arms of manageable proportions—the longest we checked had an effective length of 12½ inches—swing the pickup in an arc that is not flat at all. Two tricks of design, however, work together to reduce the tracking error that short arms cause.

The first trick is "overhang." The pickup is located so that the stylus will swing beyond the center of the record instead of meeting it. This does not make the arc of the swing any less curved. And it makes actual tracking error greater. But it does change the way the tracking error varies from groove to groove. Now the fluctuation in tracking error goes through two cycles. It can be made a minimum at two grooves. And the *range* of fluctua-

Third in a series on shopping for hi-fi components. Next month: Amplifiers.

Having the Sensitive Tuning Unit in the Radio Receiver, the Amplifier and the Speaker in the Phonograph Cabinet, the Radio Receiver and Phonograph Motor are controlled from the Phonograph Cabinet.

The Radio Receiver and Phonograph Motor are controlled from the Phonograph Cabinet.

Radio Receiver and Phonograph Motor controlled from the Phonograph Cabinet.

Radio Receiver	$1,000.00
Phonograph Motor	100.00
Phonograph Cabinet	100.00
Total	$1,200.00

Fig. 2. The six tables of different size, shape, and number of holes used in our experiments. Tables 1 and 2 are square, Tables 3 and 4 are circular, Table 5 is a rectangle with a hole in the middle, and Table 6 is a rectangle with two holes. Tables 1 and 3 are the smallest, Tables 2 and 4 are medium, and Tables 5 and 6 are the largest. Tables 1 and 2 have a hole in the middle, Tables 3 and 4 have a hole near the edge, Table 5 has a hole in the middle, and Table 6 has two holes near the edge. Tables 1 and 3 are made of wood, Tables 2 and 4 are made of metal, and Tables 5 and 6 are made of plastic.

Table	Shape	Material	Size	Hole	Hole Size	Hole Position
1	square	wood	1	1	1	middle
2	square	metal	2	1	2	middle
3	circle	wood	1	1	1	edge
4	circle	metal	2	1	2	edge
5	rectangle	plastic	3	1	3	middle
6	rectangle	plastic	3	2	3	edge

Table 1. Table characteristics.

Table 2. Mean and standard deviation of the number of trials required to learn the concepts of shape, material, size, hole, hole size, and hole position for the 6 subjects.

	Shape	Material	Size	Hole	Hole Size	Hole Position
Mean	1.0	1.0	1.0	1.0	1.0	1.0
Standard Deviation	0.0	0.0	0.0	0.0	0.0	0.0

Figure 1. Cutting the tube with a hacksaw.

Figure 2. Cutting the tube with a tube cutter.

Figure 3. Reaming the tube with a reamer.

Figure 4. Reaming the tube with a file.

Figure 5. Flaring the tube with a flaring tool.

Figure 6. Flaring the tube with a hammer and block.

Figure 1 shows the hacksaw being used to cut the tube. Figure 2 shows the tube being cut with a tube cutter. Figure 3 shows the reamer being used to remove the burr from the tube. Figure 4 shows the burr being removed with a file. Figure 5 shows the tube being flared with a flaring tool. Figure 6 shows the tube being flared with a hammer and block.

New for Your Car

Without Radio-Ready Wiring

With Radio-Ready Wiring

Radio-Ready Wiring is a new feature of Chrysler Corporation's 1948 cars. It makes installation of radio easier, faster and more dependable. Radio-Ready Wiring is a complete set of wires, terminals and connectors, ready to connect to the radio. It is installed in the factory and is protected against damage during shipping and handling. Radio-Ready Wiring is available on all Chrysler, Dodge, Plymouth and Desoto cars.

Time-Tested Tips for Winter Drives

Keep your windshield and windows free of snow and ice. Use a scraper and brush to remove all snow and ice before you drive.

Be sure your lights are on and clean. Snow and ice can reduce the amount of light from your headlights by 50 percent.

Be sure your tires have enough tread. Tires with less than 2/32 of an inch of tread are dangerously worn.

Be sure your tires are properly inflated. Tires lose about 1 pound of pressure for every 10 degrees of temperature drop.

Be sure your battery is in good condition. Cold weather can reduce its power by 50 percent.

Be sure your brakes are in good condition. Cold weather can reduce their effectiveness by 50 percent.

Be sure your engine is in good condition. Cold weather can reduce its power by 50 percent.

Be sure your heater and defroster are in good condition. Cold weather can reduce their effectiveness by 50 percent.

How to Build a Floor Polisher

If you have a floor to polish, you can save money by making this machine. It will do the job quickly and easily. The cost of the materials is low, and the time required for the job is short. The machine can be used for other purposes, such as sanding floors, scraping floors, and polishing floors.

Fig. 1. Cutting the sample with a knife. Fig. 2. Cutting the sample with a knife. Fig. 3. Cutting the sample with a knife. Fig. 4. Cutting the sample with a knife. Fig. 5. Cutting the sample with a knife. Fig.

How to Control Hardboard Expansion

Hardboard is subject to dimensional changes as it absorbs or loses moisture. Proper installation techniques can minimize the effects of these changes.

Cracks
Cracks
Cracks

Gillette Blades
Are the Best of Any Kind

Gillette Blades are made of the finest tempered steel, and are ground and polished by the most skilled workmen. Gillette Blades are sold everywhere. Ask your dealer for them.

Gillette Razor

Gillette Razor is the most perfect razor made. Gillette Blades are made to fit it. Gillette Razor and Gillette Blades are sold everywhere. Ask your dealer for them.

Gillette Strop

Gillette Strop is the most perfect strop made. Gillette Blades are made to fit it. Gillette Strop and Gillette Blades are sold everywhere. Ask your dealer for them.

Gillette Razor

Gillette Razor is the most perfect razor made. Gillette Blades are made to fit it. Gillette Razor and Gillette Blades are sold everywhere. Ask your dealer for them.

Mr. Ernest Hemingway

The Dark Hotel Corridor

By Ernest Hemingway

Illustrated by Ben Shahn

It was late in the night and I was in the dark hotel corridor. The night porter was asleep in a chair in the lobby and I was going to my room when I saw the light under the door of the room at the end of the corridor. I had forgotten that Mr. Wilson was in that room and I had forgotten that I had promised to see him that night. I knocked on the door and I heard Mr. Wilson's voice say, "Come in." I opened the door and I saw Mr. Wilson sitting in a chair by the window. He was wearing a dressing gown and he was smoking a cigar. He was a big man with a red face and he was very drunk. He was drunk in the way that he was always drunk, which was very drunk indeed. He was drunk in the way that he was always drunk, which was very drunk indeed. He was drunk in the way that he was always drunk, which was very drunk indeed.

3 Ideas for Christmas

Ideas for Christmas

Ideas for Christmas

Ideas for Christmas

Handyman Uses for Kitchen Tools

Sandpaper, cut to size, can be held in place with a pair of tongs.
Tongs can be used to hold a nail while you hammer it.
Tongs can be used to hold a screw while you drive it home.
Tongs can be used to hold a bolt while you tighten it.
Tongs can be used to hold a nut while you tighten it.
Tongs can be used to hold a washer while you tighten it.
Tongs can be used to hold a washer while you tighten it.
Tongs can be used to hold a washer

Space and comfort with relief

The Roof That Lets You Push Walls Around

By Morton M. Hodgson

A NEW roof that has a long, flat span from side to side, with no supporting walls in the middle, is being used in a number of new schools. It makes classrooms or other rooms of any size or shape possible, without the need for walls or column rows to support ceilings.

The roof is made of steel, and is called a "Vierendeel" roof after its inventor, Arthur Vierendeel, a Belgian engineer who first used it in 1896. It is a kind of truss, but it differs from the usual Warren truss, or roof truss, in that it has no diagonal members. Instead, it has vertical members and horizontal members, which are connected by rigid joints. The rigid joints make it possible for the roof to be made very light, and yet very strong. It can be made in any shape or size, and it can be made to span a very wide space.

Fig. 1 Photo of Mach Wave Formation in Supersonic Flow

Fig. 2 Photo of Shock Wave Formation in Supersonic Flow

Fig. 3 Photo of Shock Wave Formation in Supersonic Flow

Fig. 4 Photo of Shock Wave Formation in Supersonic Flow

Fig. 5 Photo of Shock Wave Formation in Supersonic Flow

**Fig.

Inside the Ford Transit van, the equipment is mounted on a sliding tray for easy access.

The Ford Transit van, with its equipment, ready for the road.

The Leyland van, with its equipment, ready for the road.

The Leyland van, with its equipment, ready for the road.

The Leyland van, with its equipment, ready for the road.

The Leyland van, with its equipment, ready for the road.

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The Leyland van, with its equipment, ready for the road.

New Tools

1. Handy Dry Wall Knife. Made of stainless steel, this knife has a 3-in. blade and a 4-in. handle. It is useful for cutting wallboard, tile, linoleum, and other materials. Price, $1.50. Sears, Roebuck and Co., Chicago, Ill.

2. Sheet Metal Shear. Cuts 16-gauge sheet metal. Price, $3.95. Sears, Roebuck and Co., Chicago, Ill.

3. Wire Stripper. Strips insulation from wire. Price, $1.25. Sears, Roebuck and Co., Chicago, Ill.

4. Electric Drill. Has a 1/4-in. chuck and a 3-in. drill. Price, $19.95. Sears, Roebuck and Co., Chicago, Ill.

5. Electric Sander. Has a 3-in. disk. Price, $19.95. Sears, Roebuck and Co., Chicago, Ill.

6. Electric Jigsaw. Has a 3-in. blade. Price, $19.95. Sears, Roebuck and Co., Chicago, Ill.

A Set of Tool Boxes Made of 1/2-in. plywood, the tool boxes are 12 in. wide, 12 in. deep, and 6 in. high. The lid is 3 in. high. The boxes are painted with a light gray primer and then with a dark gray enamel. The lettering is done with a stencil and white paint. The boxes are fastened to the table with screws and washers. The washers are used to keep the boxes from being pulled through the table when they are being moved. The boxes are made to hold the tools that are used most frequently. The tools are placed in the boxes so that they are easy to reach and so that they are not damaged by being thrown into the boxes. The boxes are made to be easy to open and close. The lids are made to be easy to open and close. The boxes are made to be easy to move. The boxes are made to be easy to store. The boxes are made to be easy to clean. The boxes are made to be easy to repair. The boxes are made to be easy to replace. The boxes are made to be easy to use. The boxes are made to be easy to carry. The boxes are made to be easy to store. The boxes are made to be easy to clean. The boxes are made to be easy to repair. The boxes are made to be easy to replace. The boxes are made to be easy to use. The boxes are made to be easy to carry.

Tests of Bombs on Ships Not Manned

Bombs Dropped on Ship Not Manned

Bombs Dropped on Ship Not Manned

Bombs Dropped on Ship Not Manned

Bombs Dropped on Ship Not Manned

Wiring With Our Insulating Tools

Our insulated tools are used by electricians and others who must work on live circuits. Our tools are tested to 10,000 volts and are guaranteed to withstand 5,000 volts for one minute.

Author Carlyle Sumner Gives Instructions to Our Technicians

Our technicians are trained by the author of our instructions, Carlyle Sumner, who is a well known electrical engineer.

Equipping Our Central Laboratory

Our central laboratory is equipped with the latest electrical equipment and instruments. Our technicians are trained in this laboratory.

Our Technicians Demonstrating Our Equipment

Our technicians are trained to demonstrate our equipment to prospective purchasers.

Three Ways to Tree Work Lathe Chucks

Most lathe chucks are designed to hold round stock. But there are many times when you need to hold square or irregular shapes. Here are three ways to do it.

1 Chuck jaws are reversed and work is held by the outside diameter. Jaws must be long enough to hold work firmly. Work should be centered in chuck by using a dial indicator.

2 Work is held by the inside diameter. Jaws must be long enough to hold work firmly. Work should be centered in chuck by using a dial indicator.

3 Work is held by the inside diameter. Jaws must be long enough to hold work firmly. Work should be centered in chuck by using a dial indicator.

1 Chucking the outside diameter. Reversed jaws are used to hold the work by its outside diameter. Jaws must be long enough to hold the work firmly. Work should be centered in the chuck by using a dial indicator.

2 Chucking the inside diameter. Work is held by its inside diameter. Jaws must be long enough to hold the work firmly. Work should be centered in the chuck by using a dial indicator.

3 Chucking the inside diameter. Work is held by its inside diameter. Jaws must be long enough to hold the work firmly. Work should be centered in the chuck by using a dial indicator.

WILL JUST SO YOU'LL STOP TRYING TO PICK UP THE BILL?

Sometimes it's difficult to pick up the bill when you're with someone who's trying to impress you with how much money he has. Well, we don't want you to have to do that. So we've created a special offer just for you. Stop by any Chevrolet dealer and we'll give you a free Chevrolet Impala. Or a free Chevrolet Caprice. Or a free Chevrolet Corvette. Or a free Chevrolet Camaro. Or a free Chevrolet Cavalier. Or a free Chevrolet Lumina. Or a free Chevrolet Lumina Minivan. Or a free Chevrolet Astro Minivan. Or a free Chevrolet Suburban. Or a free Chevrolet Tahoe. Or a free Chevrolet Blazer. Or a free Chevrolet Tracker. Or a free Chevrolet Metro. Or a free Chevrolet Prizm

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Folding Ironing Board Finds Area Under Kitchen Table Top

Hinges are added to the table top and to the board so it can be folded down and pushed under the table when not in use. Board is held up by a hinged support that folds down when board is pushed back under table. Board is held in place by a hook and eye.

Board is held down by a hook and eye when it is pushed back under the table.

Board is held up by a hinged support when it is pulled out from under the table.

Board is held down by a hook and eye when it is pulled out from under the table.

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Tools, Material Lists & Hardware and Bolt to Jaws

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Champion spark plugs are the choice of more racing drivers than any other spark plug. Champion spark plugs are used in more winning cars than any other spark plug. Champion spark plugs are used in more cars than any other spark plug. Champion spark plugs are used in more cars than any other spark plug. Champion spark plugs are used in more

[*Continued from page 144*]

"Try her now," he said, when the plugs were replaced.

Erickson turned her over. The engine caught. As it revved up, Gus detected a high-pitched, familiar whine. He brought his hand down sharply. "Cut!" he yelled.

Knute Hansen, who had sprung for the fuselage the moment the motor started, halted in mid-stride, swiveling about to look at Gus with an agonized expression.

"It's all right, Knute," Gus assured him. "The starter clutch didn't disengage—caused by the cold, probably. Try again, Erickson."

This time when Erickson engaged the starter switch the engine didn't budge. The starter seemed completely dead.

"What's wrong now?" Gus said anxiously. "Is there any way of starting this rig without the starter?"

"Not a chance," the pilot told him. "It's the starter, or nothing."

Gus quickly checked the starter cable and switch, looking for loose connections. Then he removed the starter, laid it down on the floor of the fuselage and started to take it apart.

LOOKING down at the damage, Gus stood there with the snowflakes whitening his shoulders, wondering how long it would take them to fight 20 miles through the snow to Highland afoot, and bring back a pain-racked child to his truck.

When the copter's starter had failed to disengage, the engine had spun the armature so fast that one of the windings had been thrown from the armature core slot by centrifugal force. The winding, a piece of copper about a sixteenth inch wide by an eighth of an inch in depth, had become locked between the armature laminations and the field-coil pole shoes. It had been broken in two, twisted around, flattened to knife-blade thinness.

"We're sunk," Erickson said woodenly.

"By yimminy, maybe I better start walking," Knute Hansen said. Looking into the old man's eyes Gus saw the rising panic there, and something else—a question.

"I don't know, Knute," Gus said slowly. "You see, I don't know just how much damage has been done here."

"Lay off it," Erickson said sharply. "Tell him the truth. You know as well as I do that this starter is completely shot."

"Maybe," Gus said shortly, and with a pair of side cutters he neatly snipped off the broken ends of the armature winding, tapped the stub ends down into the armature core slot, so that they wouldn't strike the field coils. He assembled the starter, with the armature carefully set in a certain position in relation to the brushes.

"Try her now, Erickson," he said.

AN EXPRESSION of surprise came over the pilot's face as the engine turned over, and then caught. The long rotor blades over Gus's head turned slowly in negative pitch. Knute Hansen tumbled into his seat.

"If you manage to get off," Gus yelled, cupping his hands, "don't stop that engine in Highland. It won't start again if that starter happens to stop on the dead commutator bar."

The rotor began to revolve faster. The squat, ugly machine began to rock in the snow, and Erickson gave her full throttle. The helicopter lifted, rose above the trees, its down-wash temporarily blinding Gus with blown whiteness. When his sight cleared he could dimly see the machine in the storm, high in the wintry sky, lined out on a course for Highland.

Gus trudged back to his truck and headed back for town. This was one service call that would have to wait. Then he smiled to himself. If all went well, he was thinking, little Inga would be back home again in time for the Christmas holiday. END

NEXT MONTH: Gus tames a grease monkey.

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Texaco Tips On Car Care

For greater driving safety

Keep your tires inflated to the pressure specified by your car manufacturer. Check them every week or every time you fill up. Check your brakes, too, and have them adjusted when they need it. Check your lights and have any burned out bulb replaced at once.

For a cleaner, fresher engine . . .

Use Texaco Crescent motor oil. Crescent motor oil is a premium quality oil that helps keep your engine cleaner and fresher. It helps prevent the formation of harmful varnish and sludge deposits. It helps you get more miles per gallon. It helps you get more miles between oil changes. Crescent motor oil is available in all popular grades and viscosities.

TEXACO DEALERS ALL OVER AMERICA

Dickinson Hungry Switch Remedies of Shorts

Hint: Dickinson Hungry Switch remedies shorts by adding a resistor in series with the switch. Choose resistor value to limit switch current to safe value. Use 1/2 watt resistor for 12 volt circuit, 1 watt for 24 volt circuit.

Dual Rotary Switch Remedies Shorts Without Loss of Function in Any Step

Dual Rotary Switch Remedies Shorts Without Loss of Function in Any Step

Alnico Tilmag Precision Polygon Holder Accommodates Any Number of Sides

Hint: Alnico Tilmag Precision Polygon Holder accommodates any number of sides. Use 1/2 watt resistor for 12 volt circuit, 1 watt for 24 volt circuit.

Dual Rotary Switch Remedies Shorts Without Loss of Function in Any Step

Dual Rotary Switch Remedies Shorts Without Loss of Function in Any Step

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Wet Shoe Stockings Results in Misery

"My Jean Nicolas gets on the aperitif with I Lambert"

Jean Nicolas Marquis de Fontenay, 1st Viscount of Fontenay, Knight of Malta

Marie Jeanne Lambert, Marquise de Fontenay, Viscountess of Fontenay, Knight of Malta

Jean Nicolas Marquis de Fontenay, 1st Viscount of Fontenay, Knight of Malta

Jean Nicolas Marquis de Fontenay, 1st Viscount of Fontenay, Knight of Malta, was the son of Jean Nicolas Marquis de Fontenay, Viscount of Fontenay, Knight of Malta, and Marie Jeanne Lambert, Marquise de Fontenay, Viscountess of Fontenay, Knight of Malta.

Jean Nicolas Marquis de Fontenay, 1st Viscount of Fontenay, Knight of Malta, married Marie Jeanne Lambert, Marquise de Fontenay, Viscountess of Fontenay, Knight of Malta, on 1 Jan 1750 in Paris, France.

Jean Nicolas Marquis de Fontenay, 1st Viscount of Fontenay, Knight of Malta, died on 1 Jan 1750 in Paris, France.

Marie Jeanne Lambert, Marquise de Fontenay, Viscountess of Fontenay, Knight of Malta, died on 1 Jan 1750 in Paris, France.

Sunbrow Pocket Keeper Now Ready

Sunbrow Pocket Keeper is a new product for the sunglass industry. It is a pocket-size case for sunglasses. Made of vinyl, it is available in black, brown, red, and blue. Sunbrow Pocket Keeper is available in 1 dozen packs.

Aqua-Matic Grooming Kitchen

Aqua-Matic Grooming Kitchen is a pet grooming center. It includes a tub, a table, and a dryer. Aqua-Matic Grooming Kitchen is available in 1 dozen packs.

Wall Paper Pressed-Around Ceramic Bath Accessories Now Ready

Wall Paper Pressed-Around Ceramic Bath Accessories are a new product for the bath. They are made of ceramic and are available in 1 dozen packs. Wall Paper Pressed-Around Ceramic Bath Accessories are available in 3 patterns: Floral, Geometric, and Leaf.

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New versatile
Screwdriver Kit only $36.95

It's a ¼" drill...a screw setter...a power screwdriver!

Porter-Cable's amazing new Screwdriver Kit gives you *three* of the world's handiest tools—at a real bargain price, if you act now.

The matchless Porter-Cable drill has all the speed and power you will ever need for any kind of drilling up to ¼" in steel and ½" in hard wood.

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Model 161 Screwdriver Kit, complete with adjustable Screw Setter (for No. 8 screws) and Screw Driver attachments with slotted screw bit and Phillips bit, and Carrying Case constructed of strong, welded steel.

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Please send me complete information on Model 161 Screwdriver Kit and name of my nearest dealer.

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Blow That Stud Down!

[*Continued from page 157*]

each series of studs—.22-caliber cartridges for ¼″-diameter studs and .32-caliber cartridges for ⅜″ studs.

Various combinations of studs and powder charges are recommended for different fastening needs. Studs with smooth shanks are for concrete. Those for steel are knurled. At the start, it's best to fire a test shot or two, trying a light charge first. The bigger charges are used when you want a heavy stud to penetrate deeper, or when shooting through hard material.

Ordinarily, each stud-and-powder combination will shoot all the fasteners to the same desired depth. If there are hard or soft spots in the work, you can switch to a stronger or lighter powder load.

In the case of the concrete-block wall, it's best to experiment on a spare block first to make sure that the stud won't go through. Also try to space the studs so that they hit the webs where the blocks are solid, not the core holes.

To fasten "soft" materials like wood, fiberboard and light metal to steel or concrete, small metal disks are supplied. The disks fit into a recess in the barrel and form large washers when studs are driven through them. They also prevent cracking when a stud is driven directly into concrete and help "slow down" a stud when even the lightest charge proves too heavy.

Interchangeable barrels. Some big guns can be adapted to take several sizes of studs and powder charges. One .22-caliber model, for instance, has a screw-in-barrel that can be replaced with a .32-caliber conversion kit so that you can use the larger ⅜″ studs.

This larger barrel also has a special "step-down" bushing so that you can still use .22s where they will fire the bigger ⅜″ studs satisfactorily, or where you may need a lower powder charge to handle a light job.

Other guns take cartridges up to .44-caliber—and that, brother, is big-game shooting! END

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Dual chassis design for independent installation or use as a complete unit. This flexible, low-cost component provides 7 panel-mounted controls. **$99.95**

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WITH A DEWALT Straight-Line Action Sander

Professional results are easy with the DEWALT Straight-Line Action Sander. Its unique action sands with the grain, leaving a smooth finish that requires little or no hand sanding. Sanding time is cut to a fraction of the time required by other sanders. Sanding belt is easily changed in seconds. Sanding belt is guided by a rubber roller and does not require tracking adjustments. Sanding belt is tensioned by a spring-loaded roller. Belt tension is adjustable for different belt widths. Belt tension is released when the sander is not in use. Belt tension is released when the belt is changed. Belt tension is released when the belt is adjusted. Belt tension is released when the belt is broken. Belt tension is released when the belt is worn out. Belt tension is released when the belt is lost. Belt tension is released when the belt is stolen. Belt tension is released when the belt is forgotten. Belt tension is released when the belt is misplaced. Belt tension is released when the belt is misunderstood. Belt tension is released when the belt is misjudged

Sunset Fruit Bowl Gift Box

Sunset Fruit Bowl Gift Box

Sunset Fruit Bowl Gift Box

"I've been mean to my wheels you mileage than you think!"

Dear Mr. Carburetor:

I've been mean to my wheels. Gave them a lot of hard work. Never gave them a good tune-up. Never changed their oil. Never even checked their tires. Now I'm sorry. I'm ready to make up for lost mileage. What do I do?

Signed: Mr. Mileage

Dear Mr. Mileage:

Your wheels need a good tune-up. Your carburetor needs a good cleaning. Your tires need a good check. Your oil needs a good change. Your mileage needs a good boost. Get it all at your Rochester Carburetor Center.

Signed: Mr. Carburetor

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With this superb jointer-planer you can plane, end-joint, tongue, bevel, or rabbet wood of any size with unequalled accuracy, ease and safety. Satin-smooth, ripple-free finish. Larger table and fence, heavier solid-steel cutter-head spindle. This is the jointer-planer you need to give your work that professional quality. Ask any experienced woodworker. Write for descriptive literature.

Atlas 10" TILT/ARBOR SAW

With this precision ATLAS 10" circular saw you can do almost every basic woodworking operation . . . faster, more accurately, and with greater safety. You can crosscut, rip, miter, dado, and shape with greater ease, precision, and smoothness. Unexcelled for general carpentry, this great saw also gives you versatility you need for fine cabinet work, built-ins, trim, and furniture projects. It's the only saw with rigid triangular arbor support, balanced tilt mechanism, bigger arbor, push-pull depth and angle control, and double-locking lift-off fence with vernier control.

Write FOR FREE CATALOG

Atlas Press Company

12-25 N. PITCHER ST., KALAMAZOO, MICHIGAN

Inside the 1957 TV Sets

[Continued from page 222]

are not needed if all the stations you watch are about equal in strength.)

• Noise killers, which stop interference that might upset the synchronizing circuits.

One *source* of interference is being eliminated this year by government edict. This is the bar pattern that one receiver puts on the screen of another one nearby. You should find pasted to the back of a new TV a label guaranteeing that the set meets Federal requirements limiting the amount of radiation it generates. This improvement protects your neighbors but doesn't help you until your neighbors also buy new sets.

Stability. To keep picture quality constant despite variations in the signal, all sets have automatic gain control ranging from simple derived types to fast, accurate keyed types. Keyed AGC is more effective at preventing the fluttering picture caused by a passing airplane.

Since a very strong signal may overload the AGC, it may be adjustable. A continuously variable control naturally provides more accurate adjustment than a simple two-position switch.

Transformers. Whether a set has its tube filaments wired in parallel and powered through a transformer, or wired in series without a transformer, matters little except in servicing. In transformerless sets, burned-out tubes are harder to find and the chassis is electrically hot.

This year a few more manufacturers eliminated transformers, but one of the biggest—RCA—reversed the trend. All '57 RCA receivers, even portables, have transformer-fed power supplies.

Now about that color. The Very Important Shows this year will be telecast in color, and there'll be some color to watch 'most any night. (You can see them in black-and-white anyway, of course.) A good 21-inch color receiver can be had for less than $500. About 60,000 people made the plunge in the first six months of '56, and the figures are still continuing to climb. Want to shake the piggy bank again? END

IDEAS FROM WELDWOOD

Lazy Susan

Use Weldwood Plywood for the base and top of this Lazy Susan. Cut the base and top to the desired size and round the edges. Mount the top on the base with a Lazy Susan bearing. Finish with Weldwood Varnish.

Tray

Use Weldwood Plywood for the base and sides of this tray. Cut the base and sides to the desired size and round the edges. Finish with Weldwood Varnish.

Bookcase

Use Weldwood Plywood for the sides, top, bottom and shelves of this bookcase. Cut the sides, top, bottom and shelves to the desired size and round the edges. Finish with Weldwood Varnish.

Table

Use Weldwood Plywood for the top of this table. Cut the top to the desired size and round the edges. Finish with Weldwood Varnish.

Chest

Use Weldwood Plywood for the sides, top, bottom and shelves of this chest. Cut the sides, top, bottom and shelves to the desired size and round the edges. Finish with Weldwood Varnish.

Chair

Use Weldwood Plywood for the seat of this chair. Cut the seat to the desired size and round the edges. Finish with Weldwood Varnish.

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United States Plywood

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MASTER MECHANIC'S DC ARC WELDERS

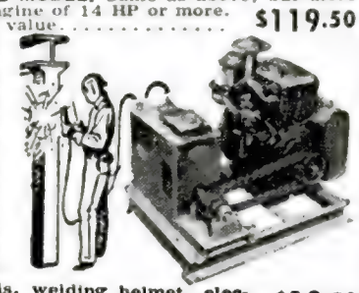
EARN BIG MONEY!
- welding
- cutting
- brazing

Save expensive repair bills

Built in our own factory these big industrial capacity, portable welders provide terrific performance, yet are sold direct-to-you at bedrock factory prices—hundreds of dollars less than you'd expect! Senior model (shown above) has high capacity DC welding unit—easily welds any thing up to 2" plate using 1/16" to 1/4" rods. Built-in stabilizer and cooling system makes arc easy to strike and hold. Dual control rheostat provides low heat soldering, brazing, and welding from 30 to 300 amps. Comes complete with instructions, guarantee and triple V-belt or flat pulley. Easy to hook up and easy to operate.

WELDER ONLY—DUAL CONTROL MODEL. Same as above, but drive with your tractor, jeep or gas engine of 14 HP or more. (Item 38a) Wt. 110 lbs. $450 value. $119.50

WELDER ONLY — INDUSTRIAL MODEL. Same as above but with ceramic rotary type control providing 74 different heat settings for all types of welding (Item 38b) $500 value $139.50



COMPLETE POWER MASTER (Illustrated at right) Powered by a heavy duty 14.6 HP air cooled Wisconsin engine—belt driven. Wt. 480 lbs. (Item 280) Welder has ceramic rotary control with 74 heat settings. Compares with welder costing $1200. Factory Special $449.50

WELDING KIT. Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at . . . $10.50

52 pc. SOCKET SET. Highest quality, guaranteed non-breakable sockets made by Husky. Beautifully matched chrome thin wall alloy absolutely the best. Contains a complete set of 28 sockets in 1/2" drive, 3/8" drive and 1/4" drive, plus all necessary extensions, handles, speeders, reversible ratchets, etc.; all uncond. guaranteed against breakage. A beautiful set of tools that will handle any job; in a big **doghouse** steel box. Wt. 17 lbs. (Item 205) List Price $62.90 Factory Special $27.95

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(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range removes kitchen smoke and odors. Powerful, continuous duty motor, 110-120 v. AC. Mount in wall or ceiling to ventilate any area. Quiet, super-efficient fan moves huge volume of air. (400 to 600 CFM).

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HEAVY DUTY FAN. Semi-enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, etc.
10" Fan, wt. 8 lbs. (Item 10E) $11.95
12" Fan, wt. 10 lbs. (Item 10D) $12.95

HIGH SPEED BARN FAN similar to above, but larger, high speed motor moves huge volume of air.
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14" Fan (Item 10g) $17.95

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SEND 10c for BIG 1957 Catalog

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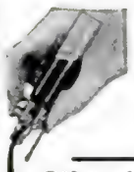

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With any color paint, stripe furniture, bikes, autos, model planes, toys, linoleum, wallboard. Clean, crisp decorative lines. Can't clog or smear. Also use with glue, tempera, textile paint or underglaze . . . on wood, glass plastic, ceramics, metals, fabrics and paper.
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DEALERS Master paint striping tool in display carton. Write for discounts.

HOBBY "Professional" results every time. Simple, easy to use. Order now.

MFRS Ask about heavy duty industrial striping tools.

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Single 1/16" stripe model $1.25

Other single stripe models $1.75 EA. 1/64', 1/32', 3/64', 5/64', 3/32' & 1/8'

Complete Kit $5.00 (all 7 tips)

Extra tips 90c ea.

Extra 1/4' tip..$1.20

WENDELL MFG. CO. 4234 LINCOLN AVE., Dept. 224 CHICAGO 18, ILLINOIS

[*Continued from page 85*]

beneath the sea, they could, Admiral Mumma says "roam the oceans of the world at will to launch deadly weapons against targets far inland."

Far more potent, those 1957 subs will be much less vulnerable than battleships. Besides their speed and maneuverability, they will be able to dive below any depth at which they are likely to be reached by bombs or depth charges, too deep even for most sound apparatus to locate them accurately.

The men who designed the Albacore knew that two forces impede a submarine:

- Skin friction. To overcome this, the sub's outside was made as smooth and as small in area as possible.
- Eddy-making resistance. To overcome this, all appendages (fins, for instance) were streamlined or were dispensed with. There is no flat deck atop the ship. Her circular hull section also offers the greatest resistance to the high pressures at great depths.

The Albacore glides through the water like a porpoise. Once, when her propelling screw had been removed, she was being towed beneath the surface by a vessel upon it. The surface ship stopped; the Albacore slid right on past.

"Look at this stubby, round hull," Skipper Boyes says, as he shows you a model of his ship. "That, I believe, is the fashion of the future. The style is going to be short and plump."

He thinks that not only will future submarines and battleships look like the Albacore, but passenger ships, freighters and tankers will, too. He thinks the day will come when almost all vessels will travel beneath the sea—not upon it.

The reason is simple. It is almost impossible to improve the performance of surface vessels any further. A surface ship is held back, like a submarine, by skin friction and eddy-making resistance, but in addition by pitching (a broncobucking swing of bow and stern), heaving (the rise and fall of the entire hull),

[*Continued on page 228*]

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Ex-Serviceman's Stepson
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Ex-Serviceman's Foster Mother
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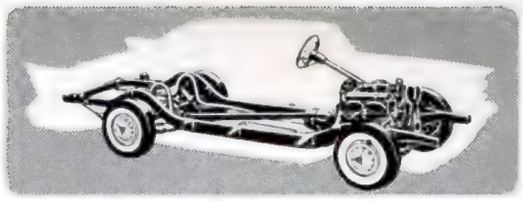
Ex-Serviceman's Adopted Daughter

glass on the top and bottom of the cylinder. Place the cylinder in the lathe and turn it down to the diameter of the piston. Cut the piston rod to length and turn down the end to fit the piston. Drill and tap the end of the piston rod for a 1/4-20 screw. Screw the piston rod into the piston and lock it with a nut



X-RAY ON CHEVROLET

This is the '57 that gets whistles from engineers!

Fuel injection on expensive foreign cars is an achievement—but in Chevrolet's class it's close to an industrial miracle! That's one of the big things that have engineers excited about the '57 Chevrolet. But look at some other precedent-breakers:

Five advanced engines, from the "Blue-Flame 140" Six through four V8's—and, with Ramjet fuel injection,* the top engine in the line produces an astounding 283 h.p. from 283 cubic inches! . . . one horsepower for each cubic inch! That's terrific efficiency!

Two automatic drives. One of the world's best-tested automatics, Powerglide.* And a brand-new torque converter, Turboglide,* with Triple-Turbine take-off. There's even a new position on the quadrant—Hill Retarder—that adds the braking power of the converter to that of the engine on hills.

Smaller 14-inch wheels. And Chevrolet uses softer tires with only 22-pound air pressure for a better ride. And there's better traction, too, that enhances Chevy's superior weight distribution.

Integrated bumper-grille styling. Smooth and clean, with no separate bumper hung on as an afterthought, it delights the eye. And there's no clutter of small pieces and fastenings to get loose and rattle. Chevy's tail assembly also follows the same modern trend for that tailored-in-steel appearance.

**Optional at extra cost.*

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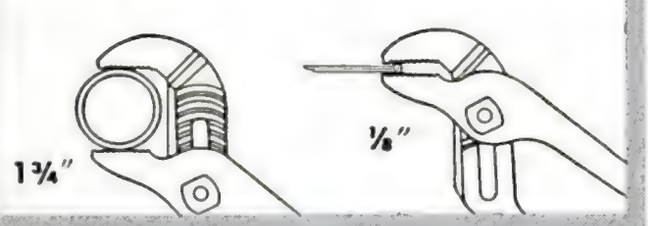

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BE SURE IT'S A GENUINE CHANNELLOCK

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What Happens When You Drink
[Continued from page 89]

the equivalent of two or three cocktails or highballs we react a trifle more slowly to the sudden flash of a light or the ring of a bell, and that we do not type, sew, add, memorize, sort out cards or do other such tasks quite as well.

SINCE our center of judgment is depressed, however, we are likely to *think* we can do everything better. When is comes to driving after a few drinks, the chief danger may well lie not in the fact that our reaction time rises—as it does—but that our confidence zooms. For the overconfident driver takes chances.

Incidentally, the Uniform Vehicle Code says that if the concentration of alcohol in your blood is under .05 percent, you are assumed to be sober. This is the level a 150-pound man generally reaches with two cocktails or three cans of beer before dinner, or twice as much after. Actual intoxication—drunkenness—starts with a level three times as high.

Hangover?

Dr. Greenberg once tried to induce this painful state in some of his graduate students by giving them a pint of whiskey apiece. No luck. It knocked them out, but in the morning, aside from queasy stomachs, they felt all right.

"They did not have what the average person means by a hangover, because they had not gone through the whole fatiguing process of a party—too much eating, too much smoking, too much horsing around and then too little sleep. They had simply had their drinks and fallen into bed."

There was another reason. Hangovers can be at least partly psychological; if you feel guilty about your drinking, it hits you worse. These men had downed their alcohol as a research project and their consciences were clear.

BESIDES deadening us to the effects of fatigue, too much alcohol upsets our electrolyte, or mineral, balance. Some of the water inside our tissue cells flows

[Continued on page 234]

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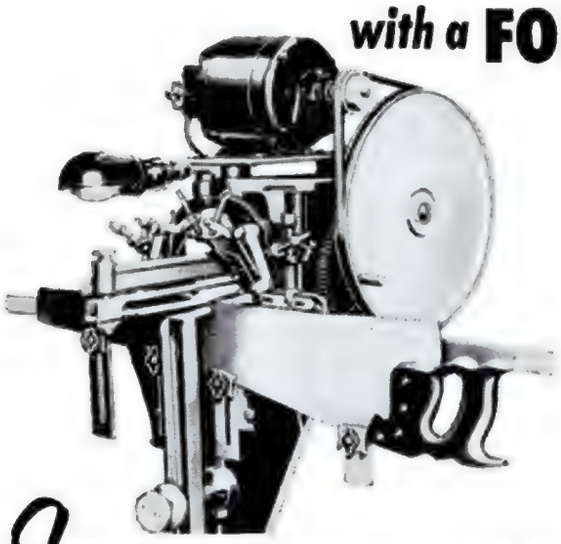
Last year's profit $3,000!

with a FOLEY AUTOMATIC SAW FILER



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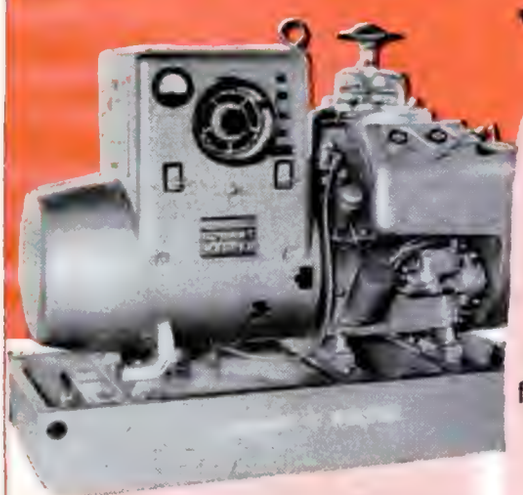

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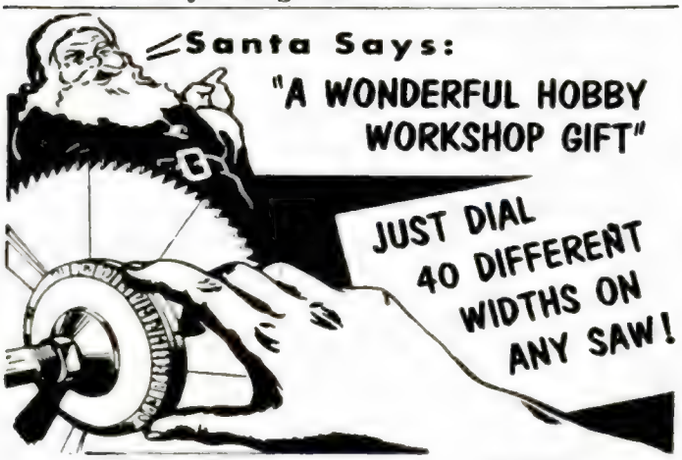

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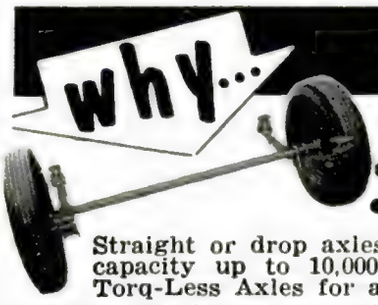

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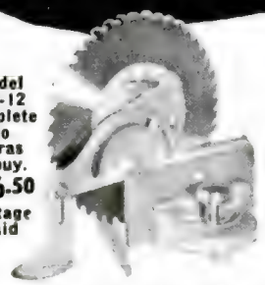

Model PG-12 Complete No extras to buy. $16.50 Postage Paid

Model PG-12 sharpens, joints, gums, and retooths all cross cut, rip, combination, miter, and planer blades up to 12" in diameter. Two precision index plates give versatile, accurate sharpening. Guarantees precise spacing of teeth. New safety rest prevents tilting and gouging of blade. Save time and money. Special $3.00 grinding wheel also included for use on your own power table. Fits regular or radial swing tables.

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FREE Booklet—How to Sharpen Circular Saws.

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GIGANTIC SAVE-TO-70% MAIL SALE

WAR SURPLUS EXCESS INVENTORY BANKRUPT STOCK

ARMY POWER PLANTS

● Amazing buys surplus Army and factory-to-you plants and generators. Save to 60%.
● 1000-w, 115-v, 60-c **$179.50** Ppd
● 2000-w, 115-v, 60-c **269.95** Ppd
● 3000-w, 115-v, 60-c **299.50** FOB
● 5000-w, 115-v, 60-c **497.50** FOB
Many other plants, generators. Get catalog.

HYDRAULICS-PUMPS-AIR COMPRESSORS

● Bargains in surplus finest quality hydraulic pumps, cylinders, valves. Also irrigation pumps, plastic pipe-fittings, and air compressors, air tanks, regulators, gauges, paint spray, etc. All in free catalog.
● Farm hyd. cylinder, **$14.41.** 1500-lb. gauge, **$3.49.** Blackhawk hyd. system **$23.95.** Control valve **$12.95.** Air Compressor **$19.95.** Air Tank **$8.79.** Gauge 160-lb. **$1.89.** Air Regulator **$3.29.** Air Filter **$2.99.** Many other air items.
● Irrigation Pump 2½" **$44.37.** Plastic Pipe ½" **8c,** ¾" **12c,** 1" **20c.** Rotary Gas Pump **$21.96.** All of the above prepaid.

MAMMOTH AIR FORCE FRESNAL FLOODLIGHT

● Makes spectacular advertising light. Multi-element hi-flux optical lens. Powerful 1000-w 115-v bulb. Built-in AC motor cooling fan. Reflective lens. Outer dispersing lens. Size 44"x31"x29", with two bulbs. Use on roof, marquee, parking lots, etc. Attracts crowds. Govt. cost $860, SALE **$44.61** Ppd.

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● One of the Army's secret weapons. Used to entangle enemy aircraft. Made of strong silken fabric. Collapsible frame. Set up in 15-min. Easy to launch even in light wind. Size 14'x10'x3'. Wt. 25 lbs.
● Wonderful spectacular advertising unit. Will haul banners aloft, pull boats, etc. Govt. cost $140 SALE **$13.99** FOB

PORTABLE ARMY BLOWER HEATER

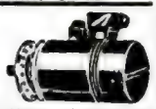
● Hi-capacity engine driven portable (on wheels) blower-heater. Burns gasoline. Tremendous heat 100,000 btu. Use for heating bldgs. under construction, starting frozen-up equipment, etc. Contractors, farmers corn drying, barn warming, etc. New Condition, perfect. Size 30" x 48" x 34". Wt. 198 lbs. Govt. $525.00.

SALE ..... $92.75 ppd.

WORLD'S LARGEST SEARCHLIGHT GEN. EL.

● Genuine new condition 800,000,000 candle power light. Has world's largest (5-ft. diameter) parabolic spun copper reflector with ultra-expensive rhodium plating. Has marvelous control motor system for revolving or tilting. Uses Std. 600x16 tires.
● Designed for carbon arc use with 100-v 150-amp DC plant (not furnished) but can be changed to ionized gas or giant size incandescent for spectacular revolving light effects.
● Used for "power-from-the-sun" experiments by leading colleges. Size 87"x66"x100".
● Amazing, spectacular, wonderful units. Actual Govt cost $22,000 SALE, **$449** FO

AC-DC 115-V and 28-V GENERATOR



● Air Corps ball bearing unit. Puts out 115-v 1500-w 800-c AC and 30-v 125 amp DC.
● Makes good small welder, battery charger or will furnish 115-v for lights, stove, iron, etc. Size 6"x9"x15". Wt. 50 lbs. Full instructions. Govt cost over $200 SALE **$16.76** FO

HOME LABORATORY EXPERIMENTAL KIT

● Amazing buy for men or boys. Make 100s fascinating experiments. Keep up with science. Have your own home laboratory. Build fire and burglar alarms, make real Geiger uranium detector, eaves dropping unit, fish shocker, etc.
● Consists of over 35 items. 115-v. AC generator, Weston meter, geiger tube, motor, AC bell, relay, Capacitors, etc. Booklets. Home Laboratory Bench, Geiger Counter, Experimental Instructions, etc. Hi-class Govt material. Wt. 9 lbs. Est. Govt Cost over $60. SALE **$6.98** FOB

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● Automatic 100 line Switch with dial...	**$13.71**
● Surveyors-Contractors Level and rod...	**46.50**
● Gear Reduction Hand Winch 1000-lb. cap.	**8.95**
● Desk Telephone (make antique lamp)..	**1.99**
● Dial Handset Phone (main line or ext.)	**13.61**
● Farmers' 5-Row Complete Crop Sprayer.	**97.50**
● Furnace Twin Blower 115-v 60-c ½ hp	**38.97**
● Navy Ball Bearing Centrif. 1½" Pump..	**24.61**
● Govt. Wind-Velocity Receiver Units...	**12.79**
● G.E. Motors, 1¼ hp 115-v 60-c 1-phase	**44.39**
● Motor Driven Hydraulic Pump 12-v.....	**44.95**

100s amazing buys in new winter catalog

SPECIAL OF THE MONTH

FARM & INDUSTRY GASOLINE PUMP

● Finest Erie gas and fuel oil pump. Very fast 10 g.p.m. Fine for pumping from barrels or tanks into trucks, tractors, etc.
● Expensive highest quality unit by a leading company. Wonderful for farm. Easy to use, simply screw ¾" iron pipe into threaded port and stick in bbl. Connect hose to outlet. Handle works back and forth very easy. Size 61½"x71½"x17". Wt. 13 lbs. List $25. SALE, **$9.71** FOB
5-ft. Oil Proof Output Hose and Fittings **$3.45**

INVALID CHAIR—BOYS AUTO MOTOR

● Marvelous ball bearing battery (6 or 12 v.) electric gear reduction motor. Makes wonderful amazing electric drive for boys auto, invalids chair, etc. Also useful for factory electric lifts—trucks, etc.
● Gear ratio 40 to 1. Hi-torque. Finest precision gears. Fully reversible. Buy of the year. Est. Govt. Cost $150. SALE, **$14.99** FOB

GOLF and PERSONNEL CARRIER MOTOR

● Amazing buy! Use for golf cars, factory personnel carriers, boys auto, and 100s other uses.
● Powerful expensive ball-bearing gear reduction motor runs on any 6-v or 12-v storage battery. Powerful high torque. Sha. speed 150-300 rpm. Full instr. Easily reversible. Wt. 34 lbs. Size 7½"x9"x14". Est. Govt. Cost $250. SALE, **$19.46** FOB

6-VOLT or 12-VOLT ELECTRIC WINCH

● Powerful marvelous 100-to-1 ratio fully reversible all ball bearing gear reduction winch. Runs from car, truck or boat battery.
● Load capacity 1000-lbs. on 6-v, 2000-lbs. on 12-v. Holds up to 40' cable. Cuts truck loading time in two. Farmers use for wagon dump, machine hoist, on jeeps or cars to pull out of mud, etc. Govt. cost $280 SALE **$46.71** FOB

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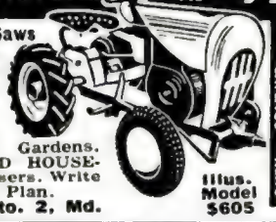

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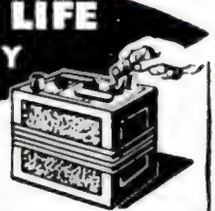
LOOK FOR THE PROTRUDING TIP!

Now... GET LONGER LIFE FOR YOUR BATTERY



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Navy NEA-5 Generator (only) — same as above . . . if purchased separately: $27.50.

R1 GENERATOR KIT Jack & Heintz or GE. Rated 300 Amps. 24-32 Volts. With same items as above incl. 300 Amp Ammeter. Approx. GOVT. COST for kit $600. Complete kit only **$39.95.** Wt. 60 lbs.

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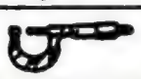
For boats, trucks, cars. By Pioneer Instrument Co., div. Bendix. Mark VIII. Graduated in increments of 1°; 360°. Major graduations every 5°. Magnetic. Can be lighted with 6, 12 or 24 volt standard bulb. Flush panel mounting. Approx. GOVT. COST $250. Perfect . . . **$10.95** ppd. (Great Xmas Gift.)



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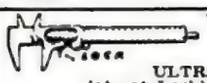

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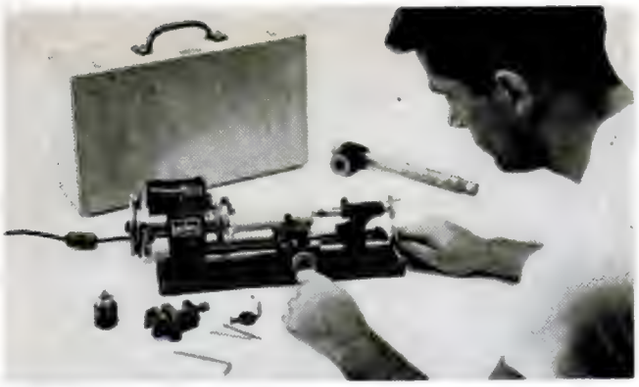

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CRAFTSMEN, MODEL BUILDERS, HOBBYISTS AND INVENTORS all over the world are choosing this unique and extremely versatile electric tool for machining small parts from steel, brass, wood, aluminum and plastics. Highly acclaimed because of its precision results, UNIMAT offers these serious craftsmen many other worthwhile advantages.

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Brand New SURPLUS!
Gov. Cost $262.00
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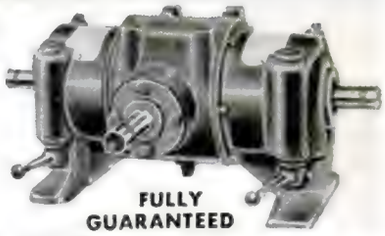

Speed Reducer Alone worth triple this price!

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- ***Reduces speed at a 3-to-1 Ratio***
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- **Ball and Taper Roller Bearings thruout for smooth, quiet operation**

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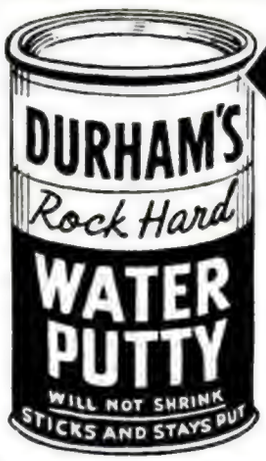

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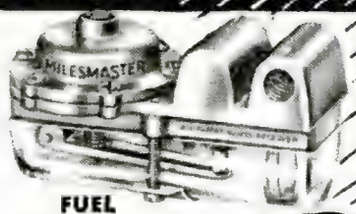

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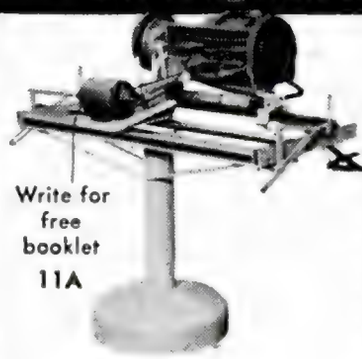

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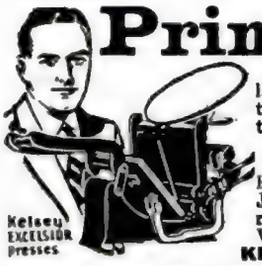

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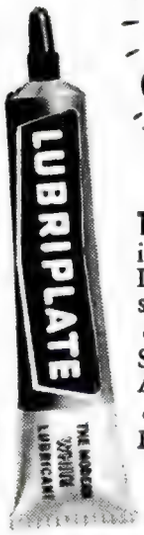

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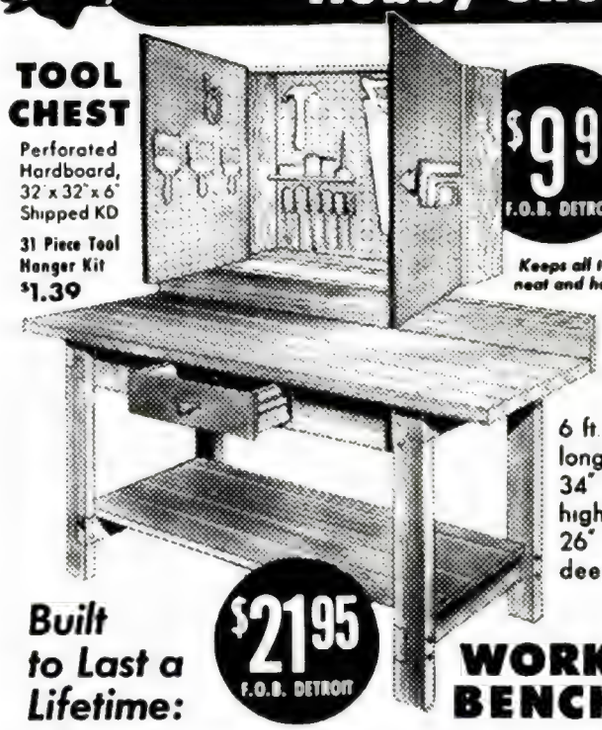

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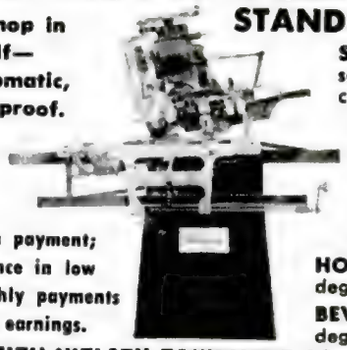

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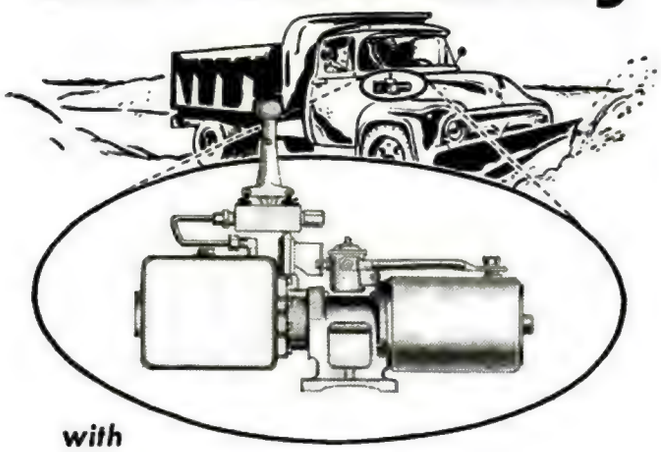

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11 – **Fitted Hardwood CASE** for all parts.

FREE BOOK ON STARS – Tells you all about the stars and the constellations – Where to find them at different times – How to identify them and many other intriguing facts on astronomy.

EXTRA 100X EYEPIECE 7.50 **125X EYEPIECE 9.95**

83 and 40 POWER ASTRONOMICAL SCOPE

Very similar to scope above but has 83X & 40X eyepieces with a 40MM objective lens. Also has a variable eyepiece of 25–30X. Steel tube body is 26" long. Included with scope is sunglass, a pair of prisms (1 erecting), a hardwood tripod and a fitted case.

Only 49.95

25 POWER x 30 MM TELESCOPE & TRIPOD

Nowhere but at PALLEY'S can you find a buy like this! Here's a scope, complete with a sturdy metal tripod, that you can have a lot of fun with. Use it to spot hits on the target, for star-gazing, interesting views at the beach, etc. Made of aluminum and chrome plated brass. Field: 62 ft. at 1000 yds. 1-3/16" dia. lens.

NEW 8.95 25.00 VAL.

AMAZING NEW DESIGN
60 to 600 POWER – 2 EYEPIECE

SPECIAL MICROSCOPE

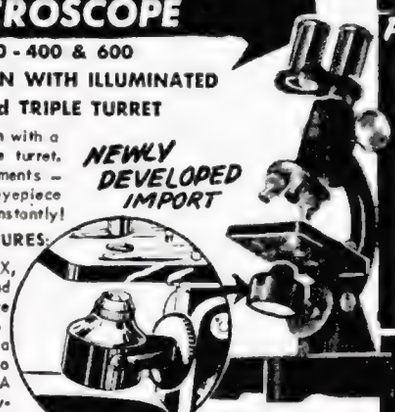
HAS 60 - 120 - 200 - 300 - 400 & 600 POWER MAGNIFICATION WITH ILLUMINATED SUB-STAGE MIRROR and TRIPLE TURRET

Now you can change magnification with a simple shift of the dual eyepiece turret. No loss of focus – No re-adjustments – Your choice of 6X or 20X eyepiece with any of the objective lenses instantly!

NEWLY DEVELOPED IMPORT

INCLUDES THESE ADDED FEATURES:

Has triple revolving turret with 10X, 20X, & 30X precision ground and polished lenses – Dual eyepiece turret with 6X and 20X lenses – New Patented Sub-Stage with a built-in, battery operated light, no external light source needed – A large sub-stage mirror with revolving variable iris – All-metal precision made body, inclines through 90° – Special fitted hardwood case and glass slides. Ideal Xmas Gift!



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Here is A COMPLETE SELF POWERED RADIO RECEIVER that picks up STANDARD BROADCAST STATIONS without using batteries or electricity! Just plug in the headset, antenna and ground wires and tune in your favorite program. You'll be amazed at the STRONG, CLEAR SIGNAL. Nothing to assemble – nothing to buy. Has a 100KC tuning range. Comes complete with the receiver, sufficient antenna and ground wires PLUS A HEADSET with two 2000 ohm earphones. Ideal for that personal or private radio.

ONLY 3.95

Special 12 Pc. SPORTSMAN'S KNIFE

3.95 WITH CASE 12.95 VALUE

Complete with Genuine Leather Holster!

NEW LOW PRICE – Same high quality. Over 20,000 sold last year – because of this large volume we are able to greatly reduce our price to you – SAVE!

IDEAL GIFT FOR FATHER, SON or FRIEND

ELIMINATE 12 ITEMS FROM YOUR PACK

Here is the Perfect, Combination Knife-Tool for every Outdoor Sportsman, Hunter, Camper, Fisherman, Boy Scout, Ranger, Rancher, etc. Think of it! 11, Fine quality Steel Tools, precision made to fold easily into the heavy bone covered body. In one neat, compact unit you have- (1) a regular knife, (2) a fork, (3) a spoon, (4) a draw-knife, (5) a bone-saw and fish-scaler, (6) scissors, (7) a can and bottle opener, (8) a cork-screw, (9) awl punch, (10) a screwdriver and (11) a metal file. All this PLUS a genuine leather, belt holster.

SPECIAL PARATROOP FOLDING MACHETE AND LEATHER HOLSTER

The latest design with a new blade shape and tapered beveled edge that is honed to cut quicker and deeper. Blade is finest, blued, nickel alloy steel. The handle is heavy bakelite with diamond point knurl to assure positive, nonslip grip. Blade folds into handle and special steel guard like a giant pocket-knife giving absolute protection to the user. When open a positive safety lock holds the blade rigidly in place. A rawhide wrist thong in handle prevents losing knife. Ideal for chopping cutting, etc. Overall 17", blade 11".

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GENUINE HEAVY DUTY LEATHER HOLSTER – For machete above. Has belt loop and long rawhide thong for leg strap. Beautifully double-stitched throughout. One-piece, extra heavy duty leather. Comes with whetstone. $1.50

FIGHTING KNIFE

NAVY KNIFE 2.98 LEATHER HOLSTER 1.00

Dagger design with laminated leather handle. Blade is 6-1/2" long, hollow-ground on the cutting edge and double-edged for 3-1/2" at the point. Ideal skinning or hunting knife. Comes with a genuine leather belt holster. Overall length 11". Order while we can supply.

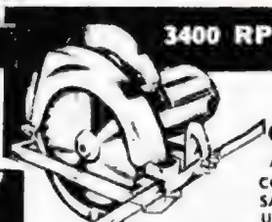
ARMY SURPLUS

NEW MACHETE ONLY 1.98

Has 22" Vanadium Steel blade with a 5" carved hardwood handle. Brand new stock. Comes with rugged belt sheath. Ideal for chopping, cutting, clearing, etc.

PORTABLE, FOLDING ARMY SHOVEL – With a 20 inch hardwood handle. Blade will fold to form a pick. Ideal for gardening or use in an emergency. 1.98

3400 RPM-½ HP POWER SAW



RIPS - CROSSCUTS

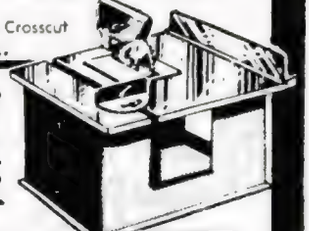
CUTS A FINISHED 2x4 LIKE A KNIFE THROUGH BUTTER

COMPARES TO SAWS SELLING UP TO $49.50 **19.98** Complete with 5-1/2" Blade

A rugged, professional type, adjustable saw. Will cut any angle from 0 to 45°. Has an adjustable (0 to 6") rip fence. Safety-trigger switch on handle. Full ½ HP Universal AC-DC, 110-120 Volt, 60 cycle motor. Weighs only 6½ lbs. Thousands already sold. Your satisfaction guaranteed.

EXTRA SAW BLADES – Available in Rip, Crosscut or Combination. Please Specify 2.25 EA.

NEW POWER SAW BENCH TABLE



This sturdy, precision made bench-saw table converts our famous power saw (above) to a handy bench saw. Permits angle and bevel cuts, rip, crosscut & comes with rip fence and mitre guide. 14"x 16" table, 6" high.

NEW ONLY 9.95

SAVE 50%

PHILIPPINE MAHOGANY LUAN PLYWOOD AT LESS THAN WHOLESALE

For Paneling Dens, Offices, etc. Use in Cabinets, Furniture, etc. Rotary cut. Both sides sanded. Bonded with finest resin adhesive. Face side unjointed. Shipped at lowest rates.

3MM (1/8") x 3FT. x 6 FT. $5.00 VALUE 1.79 PER SHEET MINIMUM ORDER 8 SHEETS

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SAVE 50% ON TRANSLUCENT FIBERGLAS PANELS

Use it for patio covers, interior decor, walls, partitions and many other uses. Ideal for the home, office, shop, indoor or outdoor installations. Finest quality. Available in many widths and lengths. Excellent color selction. Write for a FREE Sample and Booklet.

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[Continued from page 97]

percent of all injury-producing wrecks.

Device: The Safety Car's two doors are built to stay shut—through virtually any wreck. Latches—three steel bars in each one—slide into grooves in the top, bottom and side of the car. The locked-in steel bars also help to strengthen the car body.

You never saw doors like these on a car before, though you have seen them on telephone booths. Each door—there's one large one on each side—has two sections, hinged at the center. The front edge rolls in tracks along the full length of the opening so that the door folds outward to open.

The only trouble with some of these fine new homes they're building is their location—on the outskirts of your income.

—THE SIDEWALK SUPERINTENDENT

Fact: A bumper, Cornell says, should deflect a blow or absorb its energy.

Device: Front and rear bumpers curve around the car to help blows glance off. Bumpers along each side further protect the passengers.

The bumpers are mounted on springs. And the springs are embedded in a block of energy-absorbing plastic. In a smash, this material will soak up some of the impact, then slowly revert to its original shape.

Fact: Pedestrians are often hurt by bumper guards, headlight visors, even radiator ornaments.

Device: Besides the smooth front bumper, the safety car has smooth and rounded fenders, hood and grille. Headlights are recessed; ornaments are dispensed with.

Fact: Seats facing backward are safer —you are less likely to be tossed out of one in a sudden stop.

Device: One seat, backed up against the driver's, faces rearward. Cornell didn't know whether people would like to sit in it. So the idea was tried in a 1949 Studebaker. Once passengers got used to it, they liked it. Gave a club-car atmosphere, they said.

Fact: Many people complain that it is hard to tell whether today's cars are coming or going—especially at high speeds.

Device: The front and rear of the safety car look different. The front will have a horizontal motif on the grille. The rear will have a vertical design, maybe stripes.

Eight years ago, when Ed Dye and his associates began studying accidents, they ran into a difficulty at once.

"I could not," says Dye, "obtain a supply of human heads to learn why and how they cracked up in wrecks."

So before he made his plastic skulls, he experimented with eggs. "They simulate the human head," he explains. "Both consist of hard shells around fluids."

Dye placed eggs in boxes hung from the ceiling, then swung the boxes against the wall. He tried many different box designs. When he found one that kept the eggs from cracking no matter how hard it was smashed, he knew he had something.

What he had were snug-fitting pockets that held the eggs in place—which led to the car's safety belts and bucket seats. And padding—which pointed to the padding of the car.

He also had an idea—to package automobile passengers "the same as you would any other breakable object."

"Americans," Dye says, "daily climb into a car, drive many miles at dangerous speeds, use very few safety belts and a minimum of padding protection. This is just like shipping a small, delicate vase inside a large empty packing case."

The Cornell Safety Car, Dye explains, is nothing but a package designed to transport delicate objects safely—no matter how banged up the package gets. The delicate objects are you and your family. END

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Two dream cars that you'll be able to buy: Mercury's Turnpike Cruiser and Cadillac's Eldorado Brougham.

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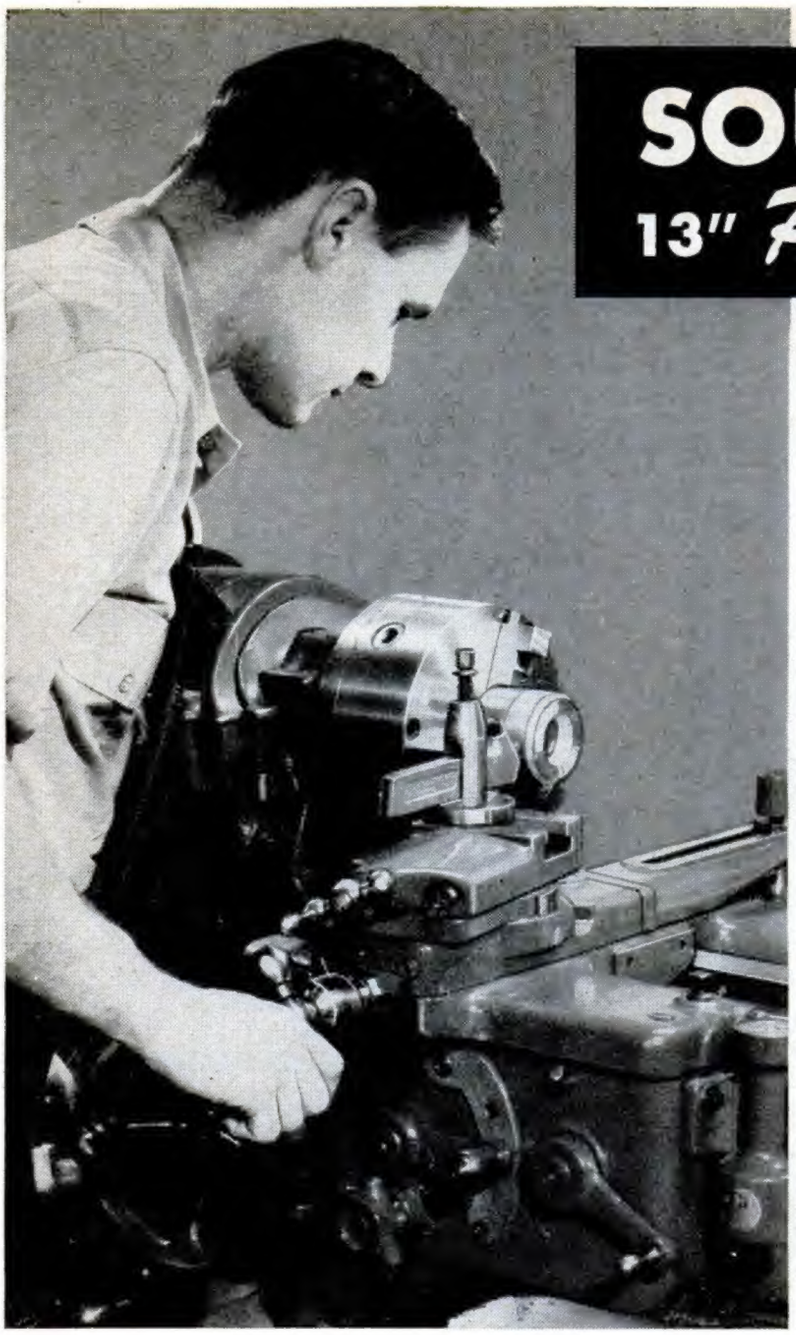

SOUTH BEND
13" *Precision* Lathes

for accurate, low-cost machining

These lathes are popular in the toolroom, production shop, or wherever varieties of precision parts are machined. Users prefer them for their simplicity and practically effortless handling. Job set-ups and tooling changes are made so quickly and easily that down-time is held to a minimum. A very complete line of attachments simplifies tooling. Send coupon for complete information.

SPECIFICATIONS

Swing—13⅛" over bed and saddle wings, 8" over cross slide.

Distances Between Centers—28", 40", 52" maximum.

Collet Capacity—1" maximum (Collets interchangeable with South Bend 10"-1" Collet, 14½", 16" and 16-24" lathes).

Spindle Speeds—Six to Sixteen 40 to 940 r.p.m. or 20 to 940 r.p.m. approximately.

Power Longitudinal Feeds—48 R.H. or L.H., .0015" to .0841".

Power Cross-Feeds—48, .0006" to .0315".

Thread Cutting—48 R.H. or L.H. pitches, 4 to 224 per inch.

HARDENED BED WAYS

Hardened and precision ground bed ways can be supplied in lieu of regular at small extra cost—also hardened and ground cross-feed screw.

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of Spain
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